K.7
5/12/05

MWH

May 12, 2005

Kevin Adler
Remedial Project Manager
Region V, Mail Code SR-6J
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Lower Aquifer Groundwater Investigation - Phase 1 Report
American Chemical Service (ACS) National Priorities List (NPL) Site
Griffith, Indiana

Dear Kevin:

This letter report presents the results of the activities completed for Phase 1 of the Lower Aquifer Groundwater Investigation. These activities were outlined in the scope of work described in the U.S. EPA-approved *Final Work Plan for Lower Aquifer Groundwater Investigation - Phase 1*, dated October 15, 2005.

This report is presented in the following sections:

- Introduction,
- Background information on the lower aquifer,
- Description of Phase 1 scope of work and sampling activities,
- Results of the Phase 1 sampling activities,
- Discussion of the Phase 1 investigation, and
- Recommendation for a Phase 2 scope of work.

INTRODUCTION

Detections of volatile organic compounds (VOCs) in the lower aquifer at the ACS Site have historically occurred at four monitoring wells: MW09R, MW10C, MW53, and MW56. The location of these monitoring wells and other features to the northwest of the ACS Site are shown in Figure 1. The primary compounds detected in samples from these wells are benzene and chloroethane. Figure 2 shows a graph of the concentrations of these two compounds in samples collected from these four lower aquifer wells from 1996 to the present.

The VOC detections in samples collected from MW09R and MW56 have been attributed to leakage from the upper aquifer along the well annulus of previously abandoned wells MW09 and ATMW4D, respectively. Since abandonment and replacement of these wells,

175 West Jackson Boulevard
Suite 1900
Chicago, Illinois
60604-2814

Tel: 312 831 3000
Fax: 312 831 3999

benzene and chloroethane concentrations at both wells have decreased. However, benzene concentrations have remained elevated in samples collected from MW56. At MW10C, benzene and chloroethane concentrations have varied without an apparent trend. Concentrations in samples collected from this well appear to be generally around 500 micrograms per liter (ug/l); with occasional detections above 2,000 ug/l. Detections of benzene in samples from MW53 began in 1997 and have slowly increased to about 10 ug/l.

Monitoring wells MW09R, MW56, and MW10C are screened at the top of the lower aquifer, just below the clay confining layer. However, the clay confining layer near MW10C is much thinner than at MW09R and MW56, and thus MW10C is screened at a higher elevation than MW09R and MW56. Monitoring well MW53 is screened in the deepest part of the lower aquifer, about 80 feet below ground surface.

Groundwater flow in the lower aquifer has been determined from years of data to be northward at a relatively low hydraulic gradient of 0.0004 feet per foot. Flow is assumed to be predominantly horizontal, as historical data does not indicate the presence of a consistent or strong vertical gradient. Although each of the affected wells is located to the west and northwest of the Site, the benzene concentrations cannot be correlated between the wells. Therefore it has not been possible to determine if this is a plume, or if the detections are individual local occurrences.

BACKGROUND INFORMATION ON THE LOWER AQUIFER

The stratigraphy of the unconsolidated sediments of the ACS Site have been determined from detailed inspections of continuous soil cores collected during previous investigations (Remedial Investigation [RI], 1990; Upper Aquifer Investigation Report, 1996; Lower Aquifer Investigation Report, 1996). The revised Long-Term Groundwater Monitoring Plan (LTGMP), approved in 2002, summarizes the characteristics of the site hydrogeology. A brief description is provided below.

The unconsolidated stratigraphy of the ACS Site consists of an upper and lower sand aquifer, separated by a clay confining layer. The sand units consist of fine to medium-grained sand with some silt and gravel. Grain size analyses from the 1996 Lower Aquifer Investigation indicate sand content greater than 90 percent of the total grain size fraction in the lower aquifer sands. Underlying the lower sand aquifer is an intermittent clay layer. These unconsolidated materials comprise between 80 and 100 feet of alluvial material overlying the bedrock near the ACS Site.

The clay confining layer between the upper and lower aquifers has been determined to be at least 20 feet thick to the south of the site, while thinning to less than 5 feet thick to the northwest of the Site. Borings show that the upper surface of the clay unit is consistently encountered within several feet of 620 feet above mean sea level (amsl). Thus, the variation in lower surface of the clay unit determines the thickness of the clay confining layer. The uncertainty in the thickness of the clay confining layer northwest of the Site has been of concern since it may provide less of a barrier between the upper and lower sand aquifers.

Northwest of the Site, where the clay confining layer is relatively thin, soil borings associated with the installation of monitoring wells also indicate the presence of a thin fine-grained layer approximately five to ten feet below the bottom of the confining clay layer. This layer was observed in the borings completed for wells MW10C, MW23, and well nest MW31/MW33/MW51. It was described as a "one to two-foot thick layer of clay or clayey silt." At these locations, a four to 10-foot thick "intermediate" sand layer was encountered between the clay confining layer and the fine-grained layer. Lower aquifer monitoring wells MW10C and MW51 are screened within this intermediate sand layer. The fine-grained layer was not observed in the soil borings for nearby well nest MW52/MW53 or monitoring well MW24, although wells MW24 and MW52 are screened at the same elevation in the lower aquifer as MW10C and MW51.

The visual descriptions of the intermediate sands are indiscernible from lower aquifer sands. However, this intermediate sand layer has been interpreted as hydraulically connected to the lower aquifer. That is because the potentiometric surface recorded at these wells is similar to that of the lower aquifer, which is consistently approximately 10 feet lower than the water elevation in the upper aquifer.

PHASE 1 SCOPE OF WORK AND DESCRIPTION OF SAMPLING ACTIVITIES

A phased Lower Aquifer Groundwater Investigation was developed to address the following questions:

1. What is the nature and thickness of the clay confining layer northwest of the ACS facility?

2. What is the source of the impacts detected at MW10C?

3. What is the source of the impacts detected at MW53?

4. Are any of the impacts related to the benzene historically detected at MW09?

5. What caused the recent spike in benzene concentrations at MW10C and what is the cause of the bubbling (ether) occurring at this well?

The results of this investigation will ultimately be used to direct efforts to reduce VOC concentrations where detected in the lower aquifer.

The first phase of this Investigation (Phase 1) focused the first two questions listed above: the nature and thickness of the clay confining layer and the nature of the VOC impacts near MW10C. The Phase 1 scope of work involved collecting groundwater samples from several depths within the lower aquifer at ten locations near lower aquifer well MW10C, and laboratory analysis of these samples for VOCs and natural attenuation parameters.

However, due to complications relating to site conditions and concern for cross-contamination between the sand aquifers, the Phase 1 work was not completed in its entirety. Seven of the ten planned sampling locations were completed, and groundwater samples were collected from the uppermost portion of the lower aquifer at six of the seven boring locations. Further discussion of the complications as well as a proposal to revise the further scope of investigation are presented below.

The Phase 1 sampling activities were conducted between November 1 and November 10, 2004. The field activities were conducted in accordance with the approved sampling methodologies outlined in the Work Plan, with the following exceptions:

- As groundwater was only collected from the upper portion of the lower aquifer, samples were collected using a peristaltic pump instead of a bladder pump. All other standard purging and sampling procedures outlined in the work plan were followed.

- Some of the locations were moved several feet from originally mapped locations to accommodate the Perimeter Groundwater Containment System (PGCS) or other obstructions, such as large trees.

- In the event that further drilling and sampling might be completed within the installed permanent casings, six of the seven casings were not abandoned. Only the casing at LA-9 was abandoned, as it was determined to have an inadequate seal. These casings will be properly abandoned during the Phase 2 of the investigation. Expandable well plugs were used to temporarily seal the top of each permanent casing.

- A groundwater sample was not collected at location LA-4, due to the observed bubbling of the water (off-gassing of ether) within the casing. Similar bubbling has been observed at MW10C since it was installed in 1990.

Each collected groundwater sample was submitted for laboratory analysis of VOCs. The sample collected at location LA-7 was also laboratory analyzed for several natural attenuation parameters. The laboratory analytical results and data validation summary are provided in Appendix A.

All work was performed in Level D personal protective equipment (PPE). The boreholes and breathing zones were routinely monitored for VOCs and explosive gases using a combination photo-ionization detector (PID), lower-explosive limit (LEL), and oxygen meter. No organic vapor readings were detected in the breathing zone, despite occasional detections of organic vapors below 10 parts per million (ppm) inside of the casing and augers.

Down-hole equipment was decontaminated between each location. Hollow-Stem Auger (HSA) equipment and augers were transported to the decontamination pad adjacent to the Groundwater Treatment Plant (GWTP) and pressure washed. Direct-push technology

(DPT) equipment was cleaned using an alconox wash and tap water rinse. Liquid wastes produced during decontamination activities and groundwater purging were collected and transported to the GWTP for treatment. Soil cuttings were collected and placed in a temporary roll-off box. The soil cuttings were shipped off-site as part of the hazardous solid waste stream of the GWTP. On January 3, 2005, these soil cuttings were transported to Onyx's facility in Port Arthur, Texas, to be incinerated.

Several conditions resulted in the scope of work being impracticable to complete using the proposed sampling methods. These included:

- Unusually high water levels: The work was originally scheduled to be completed in a drier time of the year (winter), when the water level in the wetlands is typically lower. However, large amounts of rain fell immediately before and during the work timeframe, making access to most sample locations difficult due to the high water levels. The three western-most locations (LA-1, LA-2, and LA-10) could not be accessed due to the high water levels and resulting mud.

- Potential for cross-contamination: The work area was also selected because it was believed that the upper aquifer near and to the west of MW10C was not impacted with VOCs. Based on the results from the upper aquifer sample LA-9-6'-10', it was discovered that elevated amounts of benzene were present in the upper aquifer groundwater at this location. Therefore it was decided to eliminate further drilling in this area.

- Confirmation of the thin fine-grained layer: It was believed that this fine-grained layer located ten feet below the confining clay later would possibly act as a local barrier to vertical migration of contaminants in the lower aquifer. The permanent casings purchased for the work were not long enough to set into this layer. Therefore it would not have been possible to seal off the lower zone from the surficial contamination. The decision was made to eliminate the plan to drill deeper.

Two shallow piezometers (P93R and P94R) were also installed during this field activity. These newly installed piezometers replaced a pair of damaged piezometers (P93 and P94) that originally were situated just inside and outside of the barrier wall along the west edge of the On-Site Area (Figure 1). These piezometers were installed using a DPT rig, and were constructed of 1-inch outside diameter (OD) schedule 40 polyvinyl chloride (PVC) materials with a 5-foot long "pre-packed" screened interval. The DPT rig pushed a 3.5-inch core barrel down to the desired depth.

The pre-packed screen assembly was then inserted within the core barrel to the targeted depth. The screens were installed to a total depth of about 17 feet bgs, which is near the bottom of the upper aquifer in this area of the Site. Additional sand was added as the core barrels were removed to ensure that bentonite would not enter the annular space around the pre-packed well screens. Once the sand pack was at least two feet above the top of the screen, bentonite was used to fill the remaining annular space to the surface. The

piezometers were constructed as above-ground completions, and were surrounded by protective bollards. The completion forms for these two piezometers are attached in Appendix B.

RESULTS OF THE PHASE 1 SAMPLING ACTIVITIES

Soil Boring Results

The geology of the unconsolidated sediments in the investigation area was developed from a detailed inspection of the continuous soil core samples retrieved from each of the seven completed boring locations (Figure 3), and from boring logs completed during previous drilling activities. Boring logs from Phase 1 of this Lower Aquifer Groundwater Investigation are included in Appendix C. Figure 4 shows the locations of interpreted cross-sections presented in Figures 5 and 6.

The interpretations of the soil borings completed during this investigation were in general agreement with the geology determined from previous soil borings. To the northwest of the ACS Site, the upper aquifer sands ranged between 12 and 15 feet thick. The clay confining layer was encountered at an elevation of about 619 feet amsl, and was observed to be between 2.8 and 4.8 feet thick. At borings LA-3, LA-7, LA-8, and LA-9, the thickness was between 4.4 and 4.8 feet. At the other three borings, LA-4, LA-6, and LA-5, which are located in the northern portion of the investigation area, the thickness was slightly less, ranging between 2.8 and 3.6 feet. This seems to indicate a thinning of the clay layer north of MW10C (Figure 3).

At most of the locations completed during this investigation, the fine-grained layer was observed two to three feet below the bottom of the clay confining layer. This fine-grained layer was described as silt, silty clay, or clayey silt, and was not as hard as the clay confining layer. This fine-grained layer was at least one foot thick where encountered, but a total thickness was not determined since none of the borings penetrated it. Previous borings completed as part of the installation of well MW10C suggest this layer is approximately two feet thick in this area. The intermediate sand layer was observed between the clay confining layer and the fine-grained layer. At borings LA-5 and LA-6, where the fine-grained layer was not encountered, about five feet of sand was recorded before flowing sands prevented representative sample recovery.

In Figure 5, cross-section A-A' presents a west-to-east profile from well MW23 to boring LA-5. The fine-grained layer appears to be continuous throughout the study area. The layer likely pinches out towards the east, as it was not observed in the borings completed for wells MW54R and MW55, located 300 feet to the east of LA-5 (Figure 3). The cross-section as interpreted, suggests that the clay confining layer, the intermediate sand layer, and the fine-grained layer are laterally continuous in this portion of the Site. Benzene and ether concentrations for samples collected from locations along this cross-section are shown on Figure 5.

In Figure 6, cross-section B-B' presents a south-north profile from well MW56 to well MW51, and continues northwestward to well MW52. Near well MW56, the clay confining layer is 16 feet thick, but thins to about five feet thick at locations LA-7 and MW10C. The fine-grained layer is encountered at an elevation of about 612 amsl in borings LA-7 and MW10C and about 604 feet amsl in well MW51. It is not known if the fine-grained layer is continuous from MW10C to MW51, as LA-6 was not extended to the depth at which it might have been encountered. Benzene and ether concentrations for samples collected from locations along this cross-section are shown on Figure 6.

The highest PID readings measured during the study typically occurred in the clay confining layer and in the upper aquifer sands immediately above the clay confining layer. PID readings were typically below 5 ppm in the intermediate sand layer. Ether odors were generally strongest in the intermediate sand layer, but were occasionally noticed in the upper aquifer and the clay confining layer. These odors diminished with depth within the intermediate sand layer.

Analytical Results

Results of the groundwater samples collected during this investigation are presented in Table 1. Groundwater parameters recorded upon stabilization during purging are presented in Table 2. The distribution of benzene and ether concentrations in the upper part of the lower aquifer is shown in Figure 7.

Benzene and chloroethane were detected in groundwater samples collected from all the lower aquifer boring locations, except that benzene was not detected in the sample collected at LA-6 and chloroethane was not detected in the sample collected at LA-5. Detected benzene concentrations ranged between 2.5 ug/l in the sample from LA-8, to 1,400 ug/l in the sample from LA-7. Detected chloroethane concentrations ranged between 13 ug/l in the sample collected from LA-3, to 400 ug/l in the sample collected from LA-6. Other VOC detected in the samples include methylene chloride, toluene, trans-1,2-dichloroethene, and vinyl chloride. These compounds were generally detected at or below the reporting limits for these compounds.

The benzene concentration in the sample collected at LA-9 (15,000 ug/l) was significantly higher than the benzene results from adjacent lower aquifer samples. Upon receipt of the results, the water level inside the permanent casing at LA-9 was observed to be equal to that of the upper aquifer. After pumping out the water inside the casing, the water level returned to that equal with the upper aquifer within approximately one hour, indicating that the permanent casing did not have an adequate seal. As the upper aquifer groundwater was assumed to not have been impacted with benzene in this area, a groundwater sample was collected from the upper aquifer (LA-9-6'-10') to determine if the elevated concentrations of benzene in the sample at LA-9 could possibly be related to mixing with upper aquifer groundwater.

The results of the upper aquifer groundwater sample revealed elevated benzene concentrations (80,000 ug/l) above that of the sample collected from the lower aquifer at LA-9. This indicated that the elevated benzene concentrations in sample LA-9 were due to

mixing with upper aquifer groundwater, rather than from contamination solely within the lower aquifer. Based on field observations during installation, it is possible that heaving sands during drilling may have prevented the grout from forming a complete seal around the bottom of the permanent casing. Therefore the casing at LA-9 was immediately abandoned by injecting a 100 percent bentonite slurry below the bottom of the casing. The sealing of this borehole eliminated the potential for migration of the benzene-impacted groundwater between the upper and lower aquifers along the boring.

Several tentatively identified compounds (TICs) were detected as part of the VOC analyses in the samples collected from the borings (Table 1). The identified compounds include ethyl ether (ether), ethyl acetate, tetrahydrofuran, bis(2-chlorosiopropyl)ether, and 3,3,5-trimethylcyclohexanone. Ether and tetrahydrofuran were detected in all lower aquifer samples, but were not detected in the upper aquifer sample (LA-9-6'-10').

Monitored natural attenuation (MNA) parameters were analyzed in the sample collected from location LA-7 (Table 1). While no background values are available for these results, the collected data can be used to derive some information on the general geochemical state of the lower aquifer at this location. The concentrations of oxygen and nitrate have been depleted in the groundwater, indicating that aerobic respiration and denitrification are likely active. The concentrations of iron (III) and manganese (IV) have not been totally reduced to the more soluble (dissolved) iron (II) and manganese (II). The presence of sulfate and the relatively low amounts of methane suggest that sulfate ions and carbon dioxide (methanogenesis) are not being reduced at this location. The ORP values recorded prior to collection of the lower aquifer groundwater samples (Table 1) were generally between –200 millivolts (mV) and -300 mV, which is in an optimal range for these anaerobic processes to occur. This data indicates that the groundwater in this part of the lower aquifer is moderately reduced.

DISCUSSION OF PHASE 1 INVESTIGATION

The objective of Phase 1 of the Lower Aquifer Groundwater Investigation was to investigate the vicinity of MW10C for evidence of a VOC plume that could be connected to the benzene detections in samples from downgradient well MW53. The complex geology and the difficult drilling conditions presented challenges for completing the investigation as planned. Additionally, it had been assumed during planning of the Phase 1 investigation that the upper aquifer in this area would be free of detections. However, elevated concentrations of benzene were encountered at boring LA-9. VOCs impacts in this area still exist in the upper aquifer. Because of the difficult conditions and to avoid the potential to cross-contaminate of the sand aquifers, the investigation was discontinued.

The data gathered in this limited investigation did provide information on some of the questions set forth in the work plan:

- Soil boring data confirmed the continuity of the clay confining layer near MW10C, and provided more information on the fine-grained unit just below the clay in this area.

- It appears unlikely that the contaminants detected in samples from MW10C migrated downgradient from ATMW4D/MW56, since ATMW4D/MW56 is screened deeper in the lower aquifer and the fine-grained layer is situated between the two wells (Figure 6). Additionally, benzene was detected in samples from MW10C prior to being detected in samples from ATMW4D/MW56 (Figure 2).

- While MW09R, MW10C, and MW56 are located generally upgradient of MW53, the lack of a strong vertical gradient in the lower aquifer makes it unclear if the contaminants detected in samples from these wells have migrated to the lower part of the lower aquifer where MW53 is screened.

- Other than the detections in the samples collected at boring LA-9, the highest detections of benzene in the investigation area were in the groundwater samples collected at LA-7 (see Figures 5, 6, and 7). Concentrations were lower in the samples collected from borings to the east (LA-5) and west (LA-3 and LA-8), and benzene was not detected in the sample to the north (LA-6). These results indicate that benzene impacts in the upper part of the lower aquifer are localized near MW10C.

- The detections of ether, in contrast, appear in a more uniform distribution across the upper part of the lower aquifer (see Figures 5, 6, and 7). The detected concentrations were in a similar range to the ether concentrations detected in samples collected from MW51 and MW52. The bubbling observed at MW10C and LA-4 is believed to be off-gassing of ether from the groundwater. This bubbling has occurred at MW10C since it was installed in 1990. Ether was not detected in the upper aquifer sample collected at LA-9.

- A possible source for ether is as a breakdown product of methyl-ethyl ketone (MEK), also known as 2-butanone, which was previously used in site operations. Since ether breaks down rapidly in aerobic conditions, it may have persisted in the relatively anaerobic lower aquifer, and accumulated in the upper part of the lower aquifer due to its low specific gravity. Its instability in aerobic conditions would also explain its absence in upper aquifer groundwater.

It was hoped that results from the Phase 1 investigation would provide evidence to identify the source of the benzene detected in samples from MW53 (Question #3, page 3). However, the difficulties encountered in obtaining lower aquifer samples along the investigation array (LA-1 to LA-5) have limited our ability to pinpoint the original source. However, possible sources are the production wells that ACS constructed in the lower

aquifer. The most likely candidate is IW5, one of ACS's production wells. This well was installed in 1971 and located in the blending facility in the southwest corner of the facility. It was situated upgradient of MW53, and was screened from 69 to 74 feet bgs. According to ACS personnel, the well was taken out of service in the early 1970's. During MWH's inspection in 1997, elevated PID readings were observed inside the well casing for IW5, and the water level was about 3 feet bgs.

As the well was not sealed upon decommissioning, the high PID readings and high water level in IW5 indicate that potentially impacted groundwater from the upper aquifer may have had a conduit to the lower aquifer through this well casing. Thus, contaminants would have begun migrating from a point about 70 feet below grade soon after the pumping was discontinued. Based on the calculations of average groundwater flow velocity in the lower aquifer, contaminated groundwater would have taken 23 to 24 years to migrate the distance to MW53. Benzene was first detected in samples collected from MW53 in 1997, placing the time of pump shut off at about 1974. MWH properly abandoned the well in 1998.

PROPOSAL FOR PHASE 2 SCOPE OF WORK

It is clear from the complications encountered in attempting the Phase 1 scope that it will be difficult to track the benzene impact at MW53 back to an original source. Therefore, the scope will be refined for the second phase to focus in the immediate vicinity of MW53. Monitoring well MW53 has been the only lower aquifer monitoring well at the downgradient edge of the site with detections of benzene. With the existing GWTP currently scheduled to operate for the foreseeable future, MWH has prepared a scope of work below which will identify the extent of the benzene-impacted groundwater near MW53, and optimize a pumping system to capture the impacted groundwater at MW53. This pumping system would transfer the extracted groundwater back to the GWTP for treatment and release to the wetlands in accordance with the discharge permit.

The activities that are proposed include:

- Installing five temporary sampling points
- Installing a new extraction well and pumping system near well MW53,
- Conducting a pumping test, and
- Optimize pumping rates for the pumping system to capture the benzene-impacted groundwater.

Installation of Temporary Sampling Points

An array of five temporary sampling points will be installed with 50 foot spacing to the east and west of MW53 (Figure 8). Each well will be screened to intersect the same depth level as MW53, and the sampling results will be used to determine the width of and concentration of the benzene plume, which has been detected in the samples from MW53. They will be designated TW-01 through TW-05.

These wells will be installed using standard Rotosonic® (sonic) drilling methods to a total depth of approximately 90 feet. Soil samples will be collected continuously using a six-inch outside diameter (OD) sonic casing to determine the top of the clay confining layer, located approximately 12 to 14 feet below ground surface in this area. As these points will be advanced through the clay confining layer, a 7 5/8-inch OD steel override casing will be utilized to seal off the upper aquifer. The override casing will be installed two feet into the clay confining layer. The seal of the override casing will be tested by filling with potable water and measuring drawdown after 15 minutes. The seal will be determined to be adequate if there is less than on inch of drawdown after 15 minutes. If the seal is determined to not be tight, the hole will be abandoned with bentonite grout and attempted again in a different location.

The temporary points will be installed at depths to match the screened interval of MW53, which is screened 76 to 86 feet bgs (546 to 556 feet amsl). The points will be constructed with 2-inch OD schedule 40 polyvinyl chloride (PVC) with ten feet of 0.010-inch (10 slot) factory slotted screen. Filter pack material will consist of 20-40 mesh clean silica sand that will extend at least one foot above the top of the well screen. A minimum two-foot chipped bentonite seal will be placed directly above the sand. The remaining annular space will consist of 100% bentonite slurry applied via tremie pipe. Upon completion of the well installation, the override casing will be "sonicated" (vibrated) as it is withdrawn to ensure continuity of the bentonite grout to the surrounding formation. The wells will be completed with a locking surface casing.

The new points will be developed no sooner than 24 hours after installation. Development will consist of surging and purging with a disposable bailer to remove large sediment from the well. Once the larger sediment has been removed, development will continue with a submersible pump until ten well volumes have been removed.

At least 24 hours after development, the five newly installed temporary sampling points will be sampled and laboratory analyzed for VOCs. The groundwater samples will be collected using low-flow methods currently used for routine groundwater sampling activities at the site.

All investigation-derived wastes (IDW) will be properly contained and treated. Liquid IDW will consist of decontamination water and purge water, and will be transported back to the treatment plant for treatment. Solid IDW will consist of soil cuttings, and will be incinerated off-site with the solid hazardous waste stream from the GWTP.

Extraction Well and Pumping System Installation

A new well, EW02, will be installed to facilitate the pumping test and serve as an extraction point for the new pumping system. This well will be located 10 feet east of MW53 (Figure 8) and screened to intersect the same interval as MW53. The well will be installed using the Rotosonic methods described above, and will be constructed of four-inch OD schedule 40 PVC risers with ten feet of 0.010-inch (10 slot) stainless steel

screen. The continuously wound stainless steel screen has a greater percent of open area per foot of screen than most factory-slotted PVC screens, which will provide a favorable entrance velocity for groundwater while also keeping sediment from accumulating within the well.

After the pumping test, a pumping system, similar to those at MW56 and MW10C, will be installed at EW02. Extracted groundwater will be piped back to the GWTP for treatment. The necessary parts of the system will be installed at the beginning of the Phase 2 work so that purged water from sampling and the pump test can be collected and routed back to the GWTP. The pumping test will be used to determine the optimum system to capture the benzene impact at MW53. The system will be finished once the Phase 2 activities have been completed and the design parameters for the extraction system have been determined.

Pumping Test

A pumping test will be performed at EW02 to determine the pumping rate needed to capture the benzene-impacted water near MW53. This pumping test would involve a step-test, a constant discharge pumping test, and a recovery test. An observation point will be installed 20 feet south of EW02 (Figure 8) to provide a monitoring point during the pumping test. This observation point (OW1) will be installed using the Rotosonic methods described above, and constructed of 2 inch OD schedule 40 PVC, with ten feet of 10 slot screen installed to intersect the same interval as MW53.

An electric pump capable of pumping at least 20 gallons per minute (gpm) will be used for the test. Since the pumping system to operate in well EW02 after the pumping test will run at a lower pumping rate, higher capacity piping may be used to convey purged water to the GWTP for the duration of the pumping test. Temporary aboveground water storage may also be used to hold purged groundwater for treatment if necessary.

Initially, a step-test will be completed at EW02 to provide general performance characteristics for the lower aquifer in this area. The goal of the step-test is to determine the optimal pumping rate for the long-term pumping test, such that drawdown at EW02 stabilizes, and can be measured at the observation points. The step-test involves monitoring the drawdown of the water level in the pumping well while increasing the pumping rates in steps. Each step will last for 30 minutes. Initially, the pumping rate will be set at two gallons per minute (gpm) and will increase in 2 gpm-increments, until either: 1) the stabilized water level has dropped to half of the original well column, provided drawdown is observed in the farthest observation well, or 2) drawdown does not stabilize in 30 minutes of pumping. If drawdown does not stabilize within 30 minutes at a certain pumping rate, then a slightly lower pumping rate will be used for the pumping test.

Once the pumping rate has been selected, the pumping test will be conducted. This pumping test will pump at a constant rate for 48 to 72 hours. The pumping test will be conducted for at least 48 hours to achieve steady-state conditions. Preliminary plotting of data in the field will be done to determine the actual duration of the pumping test. The drawdown will be measured regularly using pressure transducers at EW02 and three observation points: MW53 (10 feet away), newly installed OW1 (20 feet away), and

TW2 (50 feet away). Manual measurements will also be made every hour to provide backup measurements, and will be made more frequently during the first hour of the pumping test. Manual water level measurements will also be collected periodically from nearby lower aquifer well MW52, and nearby upper aquifer well MW13. Atmospheric pressure measurements will be recorded throughout the test, and the proper compensation will be made to the pressure transducer data for variations in atmospheric pressure. During the pumping test, pH, temperature, conductivity, and turbidity values will be measured from the pumped water and recorded every hour.

A recovery test will be completed following the pumping test. Once the pump has been shut off, measurements will continue to be recorded for approximately 12 hours.

The pumping test and recovery test data will be evaluated to calculate the storativity and trasmissivity of the lower aquifer, and this information will be used to calculate the necessary pumping rate required to capture the benzene plume near MW53.

Calibration of Pumping System

The results of groundwater sampling at TW1 through TW-5 will indicate the width of the benzene detections in the lower part of the lower aquifer. If the pumping test indicates that the benzene plume is too wide to be effectively captured using the pumping system in EW02, then the pumping system may be expanded to include one or more of the temporary sampling points or additional extraction wells may be proposed. If not needed, these temporary points will be properly abandoned in place. When these points are abandoned, the remaining Phase 1 casings will also be abandoned in place. This approach minimizes the number of mobilizations into the wetland area.

Health and Safety Procedures

MWH will utilize previously submitted health and safety procedures for this second phase of work. The health and safety addenda submitted as part of the Lower Aquifer Work Plan will be used to address the drilling operations. The health and safety addendum submitted with the Long-Term Groundwater Monitoring Plan (LTGWP) will be used to address the collection of groundwater samples and pump test activities.

Reporting

A report will be submitted summarizing the activities and results of Phase 2 of the investigation. If any additional work is required based on the findings of the Phase 2 activities, this will be proposed as part of this report. If no additional investigative work is required, then an operations and maintenance (O&M) plan will be submitted as part of the report. This O&M plan will outline maintenance protocols for the pumping system and monitoring activities to ensure that the system is operating as planned.

If you have any questions or comments on this report, or the proposed second phase of activity, please do not hesitate to contact me.

Sincerely,

MWH Americas, Inc.

Peter J. Vagt, Ph.D. CPG
Vice President

Attachments: Table 1 – Laboratory Analytical Summary
Table 2 – Groundwater Quality Parameters
Figure 1 – Lower Aquifer Monitoring Wells and Surrounding Features Map
Figure 2 – Concentration vs. Time Plots for Selected Lower Aquifer Wells
Figure 3 – Lower Aquifer Sampling Locations
Figure 4 – Cross-Section Location Map
Figure 5 – Cross Section A-A'
Figure 6 – Cross Section B-B'
Figure 7 – Distribution of Benzene and Ether in the Upper Part of the Lower Aquifer
Figure 8 – Proposed Locations For Sampling and Observation Points
Appendix A – Laboratory Analytical Results and Data Validation Narrative
Appendix B – Piezometer Construction Forms
Appendix C – Soil Boring Logs

cc: P. Kasarabada, IDEM
L. Campbell, Black & Veatch
B. Magel, Karaganis, White, and Magel
M. Travers, Environ

CAS/PJV/PJV/jmf/BAM/jmf
J:\209\0601 ACS\0122 General GW Remediation\Lower Aquifer Investigation\Report\LAPhase 1 Report_EPA.doc

Table 1
Laboratory Analytical Summary
Lower Aquifer Groundwater Investigation - Phase 1
ACS NPL Site, Griffith, Indiana

Sample Location	LA-3	LA-5	LA-6	LA-7	LA-8	LA-9	LA-9-6'-10'
Depth	16'-19'	18'-22'	18'-22'	20'-21.5'	17'-20'	15'-19'	6'-10'
Date	11/05/04	11/03/04	11/03/04	11/08/04	11/08/04	11/05/04	11/09/04
Volatile Organic Compounds							
Benzene	**52**	**7.7**	5 U/	**1,400 D/**	**2.5 J/**	**15,000 D/**	**80,000 D/**
Chloroethane	**13 /J**	5 U/UJ	**400 D/J**	**230 D/**	**27**	**110 /J**	**50 /J**
Methylene Chloride	5 U/	5 U/	**10**	**1.9 J/**	5 U/	**1.4 J/J**	5 U/
Toluene	5 U/	5 U/	5 U/	5 U/	5 U/	**1.2 J/J**	**6.3 /J**
Trans-1,2-Dichloroethene	5 U/	5 U/	5 U/	5 U/	5 U/	**1.9 J/J**	**13 /J**
Vinyl Chloride	5 U/	5 U/	5 U/	5 U/	**2.3 J/**	5 U/	5 U/
Tentatively Identified Compounds							
Ether	**1,100**	**1,500**	**1,200**	**460**	**550**	**510**	ND
Ethyl Acetate	**7.6**	**7.2**	ND	ND	ND	ND	ND
Tetrahydrofuran	**65**	**67**	**65**	**29**	**31**	**24**	ND
Bis(2-chloroisopropyl) ether	ND	ND	ND	ND	ND	**30**	ND
3,3,5-Trimethylcyclohexanone	ND	ND	ND	**9.8**	ND	**14**	**58**
Monitored Natural Attenuation Parameters							
Total Organic Carbon				**17,500**			
Nitrate				50 U/			
Nitrite				50 U/			
Total Iron				**15,200**			
Dissolved Iron				**9,340**			
Total Manganese				**169**			
Dissolved Manganese				**85.5**			
Sulfate				**151,000**			
Methane				**1,000 BD/**			
Ethane				**23 BJD/**			
Ethene				**0.8 BJ/**			

Notes:

Depths in feet below ground surface
ND = Not detected
All concentrations in micrograms per liter (ug/l)
Bold = Indicates compound was detected
Only detected compounds listed
D = Diluted analysis
J = Estimated concentration
U = Compound not detected above concentration shown.

All Tentatively Identified Compound (TIC) results are considered estimated concentrations.
Gray-shaded boxes indicate parameters not analyzed for in the sample.
No groundwater sample was collected from boring LA-4.
LA-9-6'-10' was collected from the upper aquifer.

Table 2
Groundwater Quality Parameters
Lower Aquifer Groundwater Investigation - Phase 1
ACS NPL Site, Griffith, Indiana

Sample Location	LA-3	LA-5	LA-6	LA-7	LA-8	LA-9	LA-9-6'-10'
Depth	16'-19'	18'-22'	18'-22'	20'-21.5'	17'-20'	15'-19'	6'-10'
Date	11/05/04	11/03/04	11/03/04	11/08/04	11/08/04	11/05/04	11/09/04
pH (S.U.)	7.07	6.95	7.37	7.08	7.15	7.31	6.67
Specific Conductivity (mS/cm)	1.30	1.20	1.20	1.40	1.40	1.40	0.81
Turbidity (NTU)	990	290	560	240	990	700	870
Dissolved Oxygen (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature (°C)	13.4	13.0	13.5	12.9	12.2	13.3	13.4
Oxidation-Reduction Potential (mV)	-254	-298	-230	-169	-218	-296	-135

Notes:

Values were recorded upon stabilization.

Depths in feet below ground surface.

S.U. = Standard units

mS/cm = Millisiemens per centimeter

NTU = Nephelometric Turbidity Units

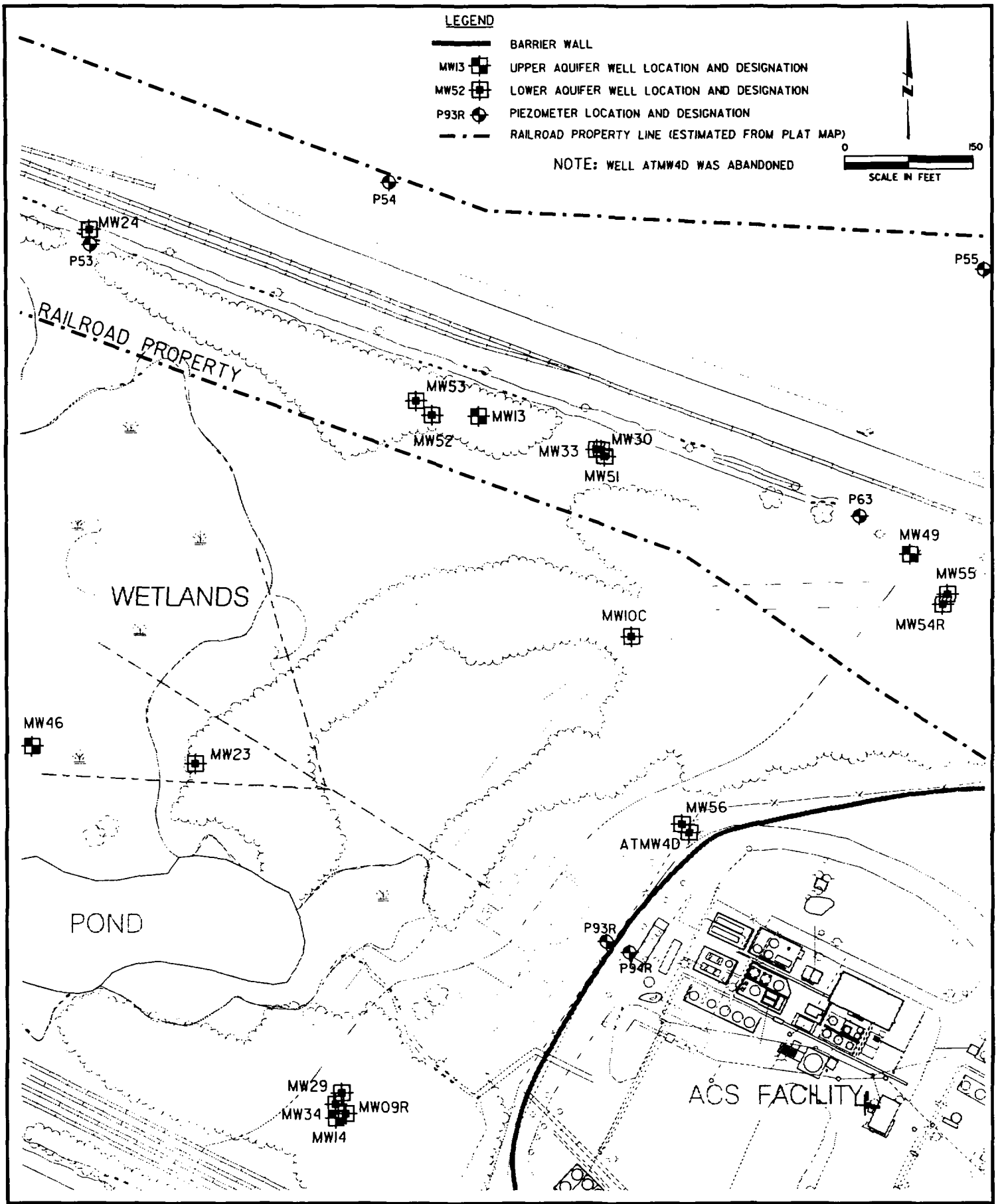
mg/l = milligrams per liter

mV = millivolts

°C = Degrees Centrigrade

No groundwater sample was collected from boring LA-4.

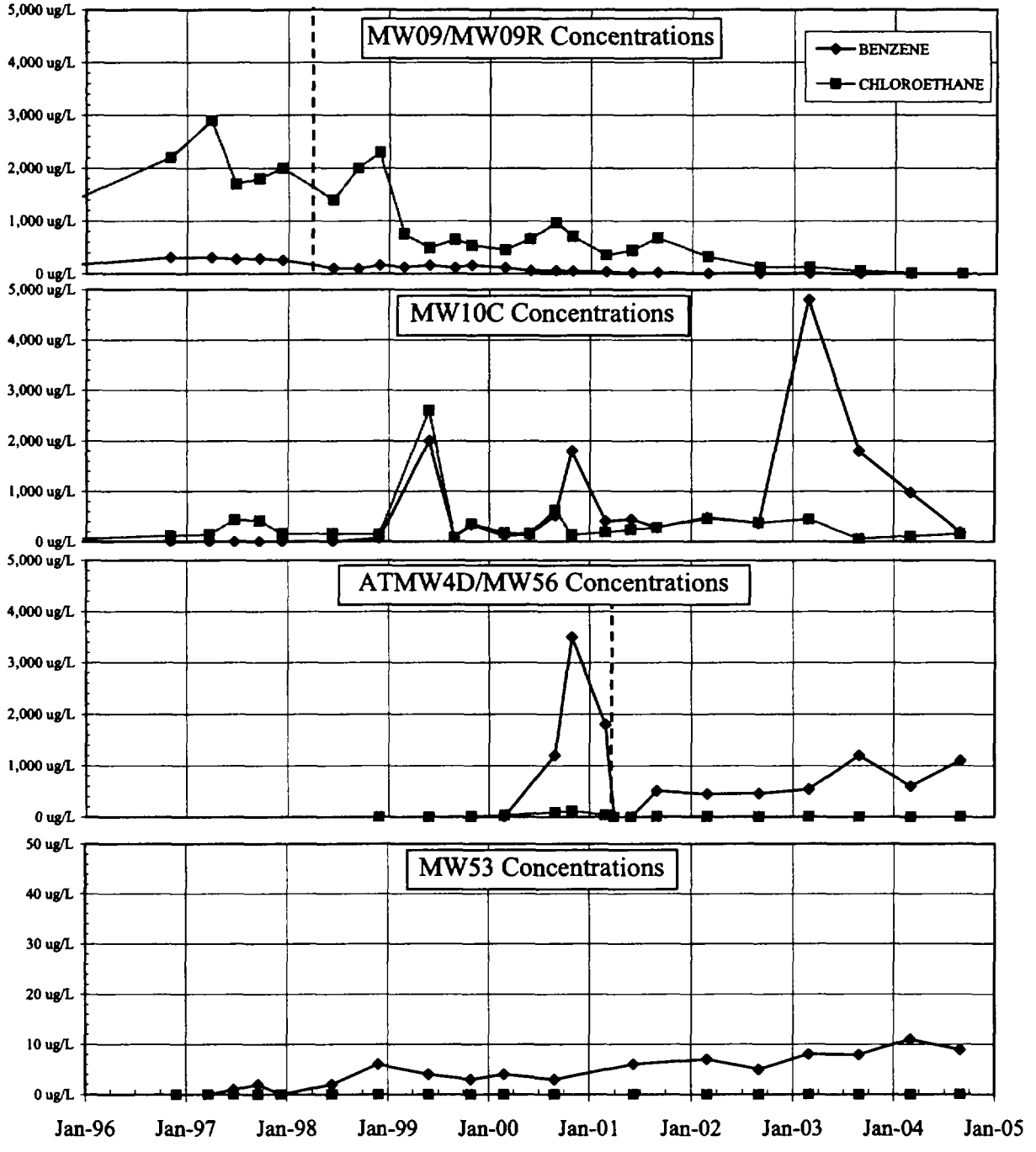
LA-9-6'-10' was collected from the upper aquifer.



MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA	LOWER AQUIFER MONITORING WELLS AND SURROUNDING FEATURES MAP	FIGURE 1

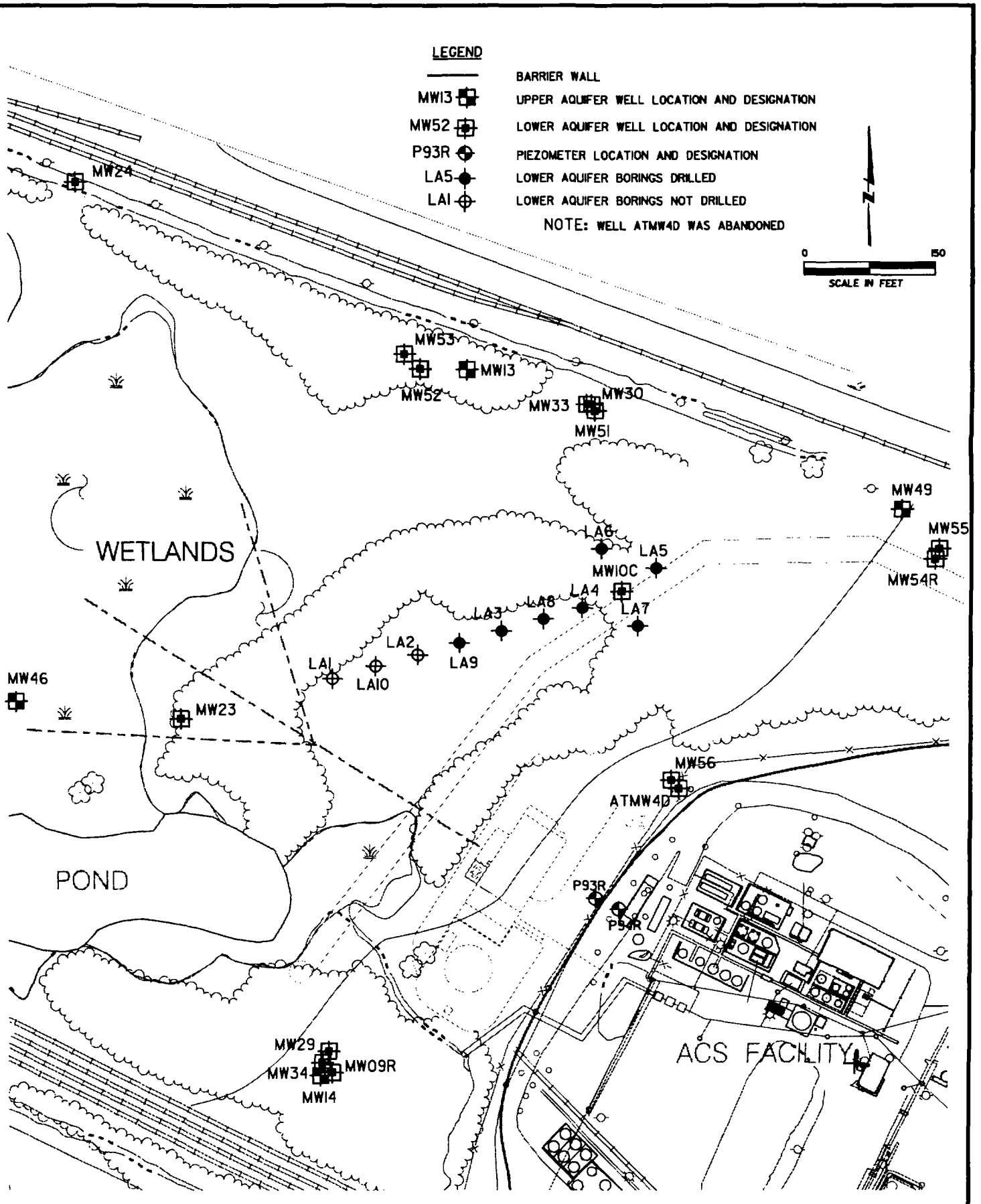
FILE: \\uschi4s02\Warrenville\Jobs\209\060\ACS\022 General GW Remediation\Lower Aquifer Investigation\Drawings\Figure 1_RR.dgn Plot Date: 4-MAY-2005 15:02

Figure 2. Concentration versus Time Plots for Selected Lower Aquifer Wells
American Chemical Service NPL Site, Griffith Indiana



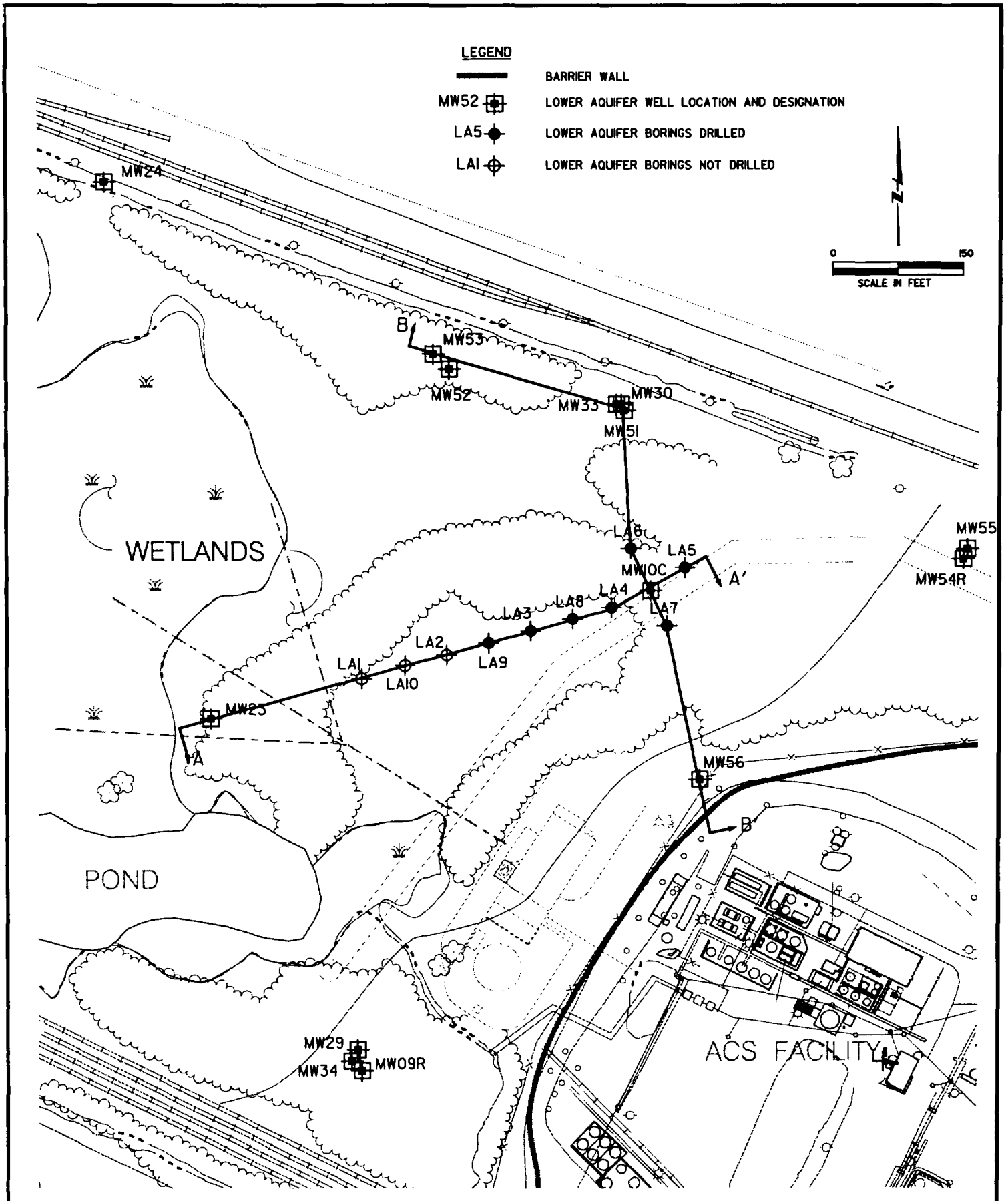
Notes:
Vertical dashed lines indicate when well was replaced (if applicable)
ug/l - micrograms per liter

CAS/PJV
J:\209\0601 ACS\0122 General GW Remediation\Lower Aquifer Investigation\Report\Figure2.xls[Figure 2]



MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE *GRIFFITH, INDIANA*	LOWER AQUIFER SAMPLING LOCATIONS	FIGURE 3

FILE: \\Usch14s02\Warrenville\Jobs\209\0601ACS\0122 General GW Remediation\Lower Aquifer Investigation\Drawings\Figure 3.dgn Plot Date: 4-MAR-2005 12:35



MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA	CROSS-SECTION LOCATION MAP	FIGURE 4

FILE: \\Uschi4s02\Warrenville\Jobs\209\0601 ACS\022 General GW Remediation\Lower Aquifer Investigation\Drawings\Figure 4.dgn Plot Date: 05-APR-2005 08:02

WEST
A

EAST
A'

ELEVATION IN FEET ABOVE MEAN SEA LEVEL

640
630
620
610
600
590
550
540

MW23 | LA9 | LA3 | LA8 | LA4 | MW10C | LA5

UPPER AQUIFER

CLAY CONFINING LAYER

SAND LAYER (LOWER AQUIFER)

FINE GRAINED LAYER

LOWER AQUIFER

LOWER CLAY LAYER

MW23	LA9	LA3	LA8	LA4	MW10C	LA5
ND 8.9	80,000 ND	52 1,100	2.5 550	NS	190 760	7.7 1,500
	15,000 510					

NOTE:

1. THE STRATUM LINES ARE BASED ON INTERPRETATION BETWEEN BORINGS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. LONG DASHED LINES INDICATE INFERRED CONTACTS; SHORT DASHED LINES INDICATE INTERPOLATED OR UNKNOWN CONTACTS.
3. CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L).

52
1,100 SCREEN INTERVAL
(TOP NUMBER INDICATES BENZENE CONCENTRATION,
BOTTOM NUMBER INDICATES ETHER CONCENTRATION:
"LA" LOCATIONS SAMPLED IN NOV 2004, "MW" LOCATIONS SAMPLED IN SEPT 2004)

ND SIGNIFIES BELOW LABORATORY DETECTION LEVEL.

NS NOT SAMPLED.

0 50
SCALE IN FEET

SCALE			
AS SHOWN	MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA	CROSS-SECTION A – A'

FIGURE 5

J:\209\0601 ACS\0122 General GW Remediation\Lower Aquifer Investigation\Drawings\CROSS SECTION.dwg Apr 05, 2005 - 8:07am

SOUTH
B

NORTH
B'

ELEVATION IN FEET ABOVE MEAN SEA LEVEL

640
630
620
610
600
590
550
540

MW56
LA7
MW10C
LA6
MW51
MW33
MW52
MW53

UPPER AQUIFER

CLAY CONFINING LAYER

FINE GRAINED LAYER

LOWER AQUIFER

LOWER CLAY LAYER

1,400
460

190
760

ND
1,200

ND
1,500

ND
2,100

1,100
5.8

ND
ND

9
ND

?
?
?

NOTE:

1. THE STRATUM LINES ARE BASED ON INTERPRETATION BETWEEN BORINGS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. LONG DASHED LINES INDICATE INFERRED CONTACTS; SHORT DASHED LINES INDICATE INTERPOLATED OR UNKNOWN CONTACTS.
3. CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L).

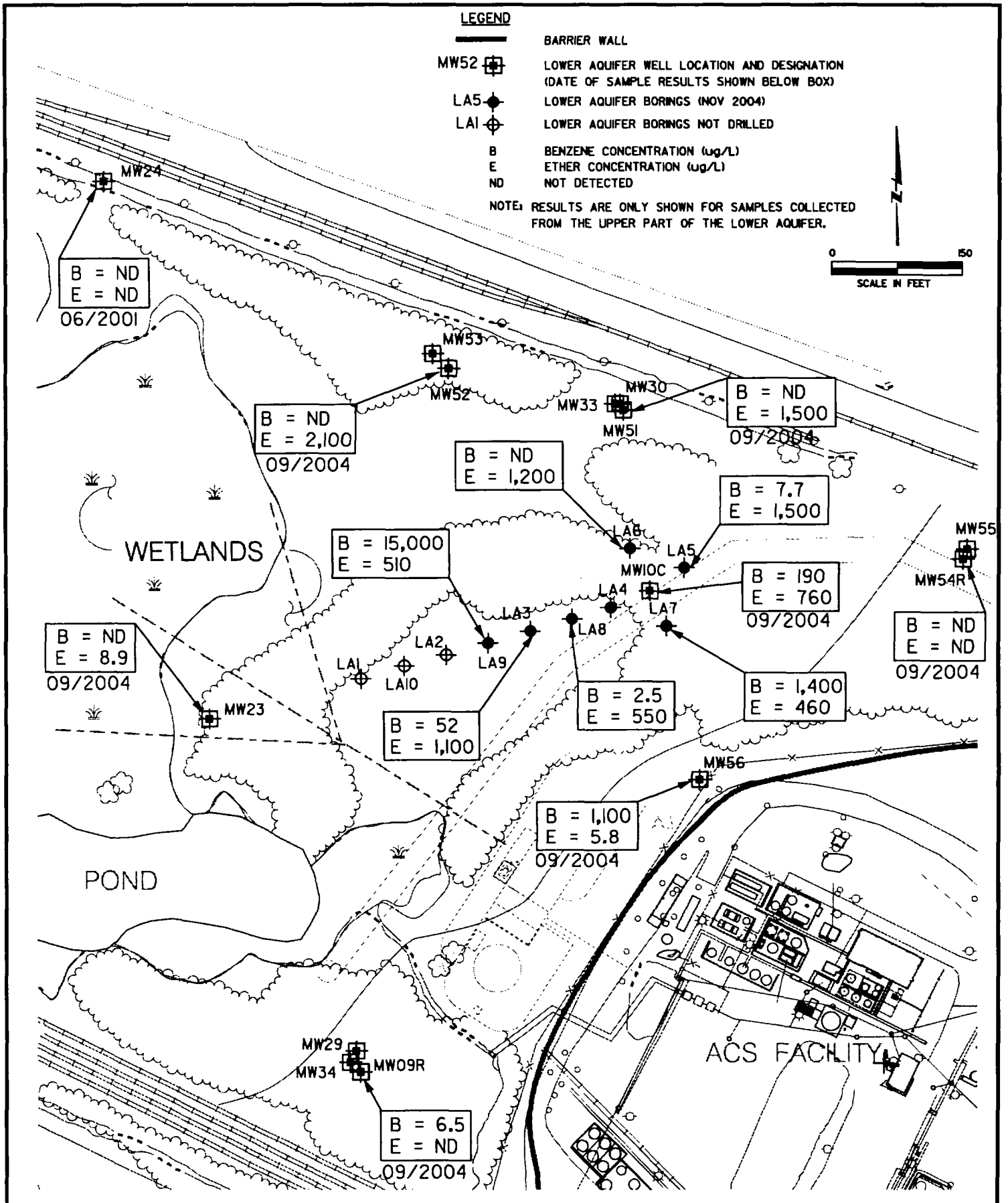
190
760 SCREEN INTERVAL
(TOP NUMBER INDICATES BENZENE CONCENTRATION,
BOTTOM NUMBER INDICATES ETHER CONCENTRATION:
"LA" LOCATIONS SAMPLED IN NOV 2004, "MW" LOCATIONS SAMPLED IN SEPT 2004)

ND SIGNIFIES BELOW LABORATORY DETECTION LEVEL.

0 50
SCALE IN FEET

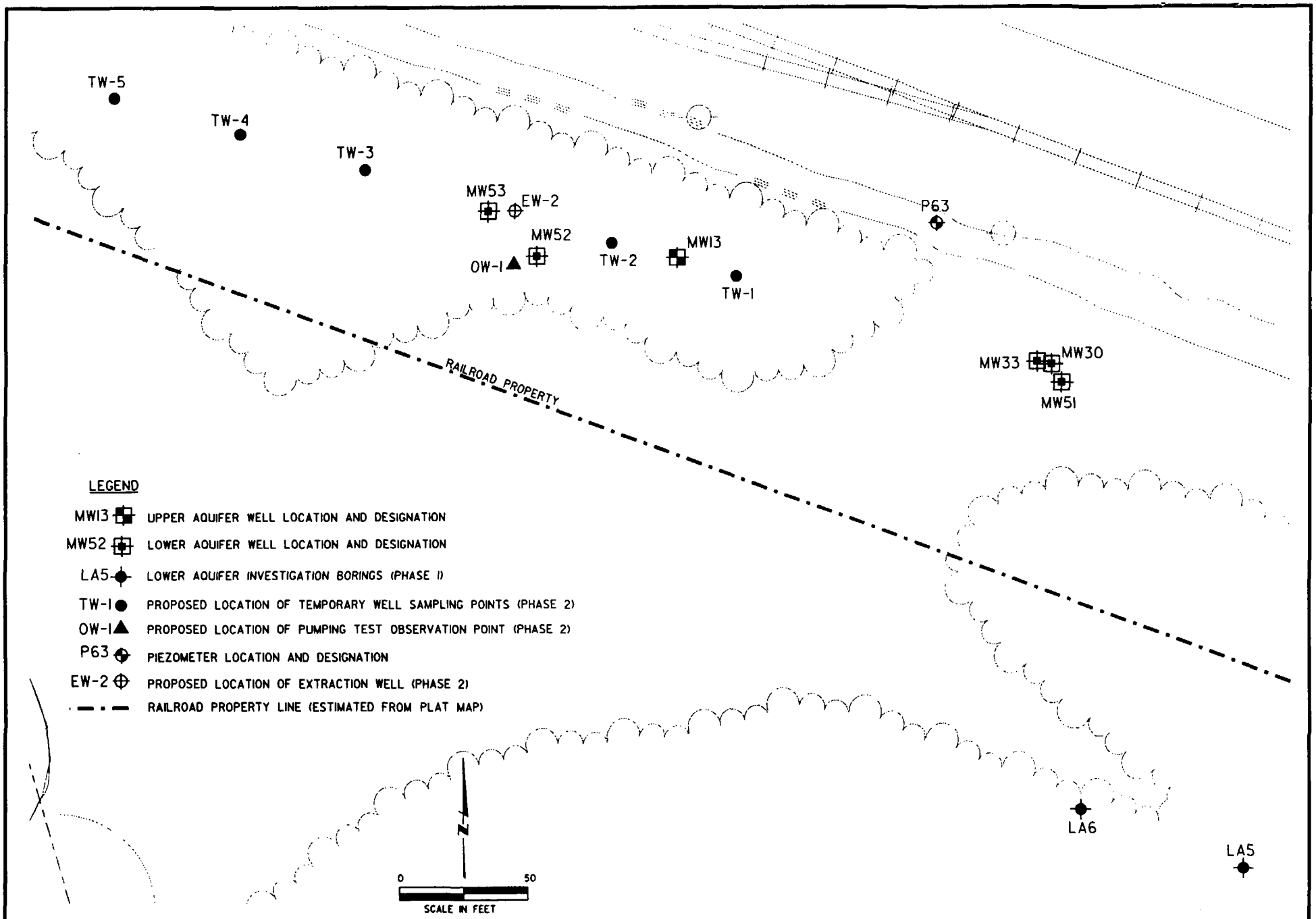
SCALE			FIGURE
AS SHOWN	MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA CROSS-SECTION B – B'	6

J:\209\0601 ACS\0122 General GW Remediation\Lower Aquifer Investigation\Drawings\CROSS SECTION.dwg Apr 05, 2005 - 7:38am



MWH	AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA	DISTRIBUTION OF BENZENE AND ETHER IN THE UPPER PART OF LOWER AQUIFER	FIGURE 7

FILE: \\Uschi4802\Warrenville\Jobs\209\0601ACS\022 General GW Remediation\Lower Aquifer Investigation\Drawings\Figure 7.dgn Plot Date: 26-APR-2005 9:55



MWH

AMERICAN CHEMICAL SERVICE, INC.
NPL SITE
GRIFFITH, INDIANA

PROPOSED LOCATIONS FOR SAMPLING AND OBSERVATION POINTS

FIGURE 8

FILE: \\uschi4s02\Warrenville\Jobs\209\0601ACS\022 General GW Remediation\Lower Aquifer Investigation\Drawings\Figure 8_RR.dgn Plot Date: 11-MAY-2005 13:05

APPENDIX A

Laboratory Analytical Results and Data Validation Narrative

Volatile Organic Compound Analysis (SW-846 8260B)
SDG 4814
SDG 4879
SDG 4922
SDG 4936
SDG 4937
SDG 4951

Total Iron and Manganese Analysis (SW-846 6010) – SDG 4937

Dissolved Iron and Manganese Analysis (SW-846 6010) – SDG 4938

Nitrate, Nitrite, Sulfate, TOC Analysis - SDG 4937

Methane, Ethane, Ethene Analysis (RSK-175) – SDG 4937

Data Validation Narratives
SDGs 4814, 4879, 4922, 4936, 4937, 4951

Data Validation PARCC Summary Report

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG: 4814
PROTOCOL: SW-846

SAMPLE IDENTIFICATIONS: ACS-GW-DL02, ACS-GW-DL05, ACS-GW-DL09A, ACS-GW-PZ105, ACS-GW-TW01, ACS-GW-TW02, ACS-GW-TW03, ACS-GW-TW04, ACS-GW-DUP01, ACS-GW-TB01, ACSGW-LA-TB01

The eleven water samples listed above were received intact, properly refrigerated at temperatures of 2.4 – 5.8°C, with proper documentation, in sealed shipping containers on October 27 to November 4, 2004. The samples were scheduled for the requested analyses of the volatile fraction. SW-846, 3rd Edition, Update 3, Method 8260B was used to analyze the above samples. The pH values of these samples are tabulated on the run logs in the standards portion of the report. All pertinent Quality Assurance Notices are included in the narrative section, and all pertinent Laboratory Notices for SDG 4814 are included in the sample data sections.

Analysis holding time requirements were met for all of these samples. Target compounds were identified above the Contract Required Quantitation Limit (CRQL) in several of these samples. Tentatively Identified Compounds (TICs) were found in all of these samples. Some of the TICs found in these samples were assessed as laboratory artifacts, and therefore may not be sample constituents. Manual quantitations were performed on one or more of the process files associated with this SDG. The reasons have been coded with explanations provided in the notice included in the narrative section of the SDG.

In the initial analysis of ACS-GW-PZ105 and ACS-GW-TW01, the on-column amount of at least one target compound exceeded the instrument's analytical range as defined by the highest concentration level of the Initial Calibration. The samples were reanalyzed using a smaller aliquot of raw sample to bring the on-column amount into range. We have reported both analyses of these samples. Based on screen data, ACSGW-TW02 was reported as a dilution. The RIC of the screen has been included behind the RIC of the dilution in the sample data portion of the case.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG. All of the system monitoring compounds met recovery criteria in the analyses of these samples. All of the internal standards met response and retention time criteria in the analyses of these samples. The associated method blanks met all quality control criteria. The associated Laboratory Control Sample (LCS) met all accuracy criteria. ACS-GW-TW03 was used to prepare the duplicate matrix spikes as requested.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Andrew J. Walker
Senior Scientist
November 18, 2004

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG # 4879
CONTRACT # SW-846 8260B

SAMPLE IDENTIFICATIONS: ACSGWLA5-18-22, ACSGWLA6-18-22

The two (2) aqueous samples listed above were received intact, properly refrigerated at a temperature of 5.8°C, with proper documentation, on November 4, 2004. The samples were scheduled for the requested volatile analysis by method 8260B 5ml purge for the requested group of compounds.

Analysis holding time requirements were met for the samples. The pH values of these samples are tabulated on the attached batch sheet.

Both samples were analyzed neat. Both samples contained compounds above the Contract Required Quantitation Limit (CRQL). Sample ACSGWLA6-18-22 contained chloroethane above the initial calibration range. It was reanalyzed at the appropriate dilution. Both sets of data have been reported. Tentatively Identified Compounds (TICs) were found in both samples. Ether was found as a TIC in both samples.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG.

All of the system monitoring compounds met recovery criteria in the analyses of these samples. All of the internal standards met response and retention time criteria in the analyses of these samples. The associated method blanks met all quality control criteria.

A laboratory control sample was analyzed with each batch for this SDG and they passed all QC criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Susan W Bass

Susan W. Bass
Director of Laboratory Operations
November 8, 2004

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG # 4922
CONTRACT # SW-846 8260B

SAMPLE IDENTIFICATIONS: ACSGWLA-DUP01, ACSGWLA316-19, ACSGWLA915-19

The three (3) aqueous samples listed above were received intact, properly refrigerated at a temperature of 1.3°C, with proper documentation, on November 6, 2004. The samples were scheduled for the requested volatile analysis by method 8260B 5ml purge for the requested group of compounds.

Analysis holding time requirements were met for the samples. The pH value for these samples is tabulated on the attached batch sheet.

All of the samples contained at least one compound above the Contract Required Quantitation Limit (CRQL). Sample ACSGWLA915-19 contained benzene above the initial calibration range. It was reanalyzed at the appropriate dilution. Both sets of data have been reported.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG.

All of the system monitoring compounds met recovery criteria in the analyses of these samples. All of the internal standards met response and retention time criteria in the analyses of these samples. The associated method blank met all quality control criteria.

A laboratory control sample was analyzed with the samples and passed all QC criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Susan W Bass

Susan W. Bass
Director of Laboratory Operations
November 9, 2004

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG # 4936
CONTRACT # SW-846 8260B

SAMPLE IDENTIFICATIONS: ACSGWLA7-20-21.5, ACSGWLA8-17-20

The two (2) aqueous samples listed above were received intact, properly refrigerated at a temperature of 3.9°C, with proper documentation, on November 9, 2004. The samples were scheduled for the requested volatile analysis by method 8260B 5ml purge for the requested group of compounds.

Analysis holding time requirements were met for the samples. The pH value for these samples is tabulated on the attached batch sheet.

All of the samples contained at least one compound above the Contract Required Quantitation Limit (CRQL). Sample ACSGWLA7-20-21.5 contained chloroethane and benzene above the initial calibration range. It was reanalyzed at the appropriate dilution. Both sets of data have been reported. Tentatively Identified Compounds (TICs) were reported for these two samples. Both samples contained ether.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG.

All of the system monitoring compounds met recovery criteria in the analyses of these samples. All of the internal standards met response and retention time criteria in the analyses of these samples. The associated method blank met all quality control criteria.

A laboratory control sample was analyzed with the samples and passed all QC criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Susan W Bass

Susan W. Bass
Director of Laboratory Operations
November 10, 2004

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG 4937
PROTOCOL: SW-846

SAMPLE IDENTIFICATIONS: ACSGWLA-TB02

The water sample listed above was received intact, properly refrigerated at a temperature of 3.9°C, with proper documentation, in a sealed shipping container on November 9, 2004. The sample was scheduled for the requested analyses of the volatile fraction. SW-846, 3rd Edition, Update 3, Method 8260B was used to analyze the above sample. The pH value of this sample is tabulated on the run log in the standards portion of the report. All pertinent Quality Assurance Notices are included in the narrative section, and all pertinent Laboratory Notices for SDG 4937 are included in the sample data sections.

Analysis holding time requirements were met for this sample. No target compounds were identified above the Contract Required Quantitation Limit (CRQL) in this sample. Manual quantitations were performed on one or more of the process files associated with this SDG. The reasons have been coded with explanations provided in the notice included in the narrative section of the SDG.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG. All of the system monitoring compounds met recovery criteria in the analyses of this sample. All of the internal standards met response and retention time criteria in the analyses of this sample. The associated method blank met all quality control criteria. The associated Laboratory Control Sample (LCS) met all accuracy criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Andrew J. Walker
Senior Scientist
November 20, 2004

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE

SDG # 4951
CONTRACT # SW-846 8260B

SAMPLE IDENTIFICATIONS: ACSGWLA9-6-10

The one (1) aqueous sample listed above was received intact, properly refrigerated at a temperature of 2.3°C, with proper documentation, on November 10, 2004. The sample was scheduled for the requested volatile analysis by method 8260B 5ml purge for the requested group of compounds.

Analysis holding time requirements were met for the sample. The pH value for this sample is tabulated on the attached batch sheet.

The sample contained benzene above the initial calibration range. It was reanalyzed at the appropriate dilution. Both sets of data have been reported. Tentatively Identified Compounds (TICs) were reported for this sample.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG. Overall QC criteria were met for all initial and continuing calibration standards associated to this SDG. There is no Form VII in the deliverables package for the batch analyzed on instrument 59 on 11/10/04 associated with the BFB injected at 1016. This batch included an initial calibration and the relevant relative response factors are all displayed on the appropriate Form VI. The initial calibration met all acceptance criteria and therefore samples could be analyzed without having to inject a continuing calibration verification standard.

All of the system monitoring compounds met recovery criteria in the analyses of these samples. All of the internal standards met response and retention time criteria in the analyses of these samples. The associated method blanks met all quality control criteria.

A laboratory control sample was analyzed with each batch for the samples and passed all QC criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Susan W Bass

Susan W. Bass
Director of Laboratory Operations
November 12, 2004

CompuChem

a division of Liberty Analytical Corporation

Notification Regarding Manual Editing/Integration Flags

In some instances, manual adjustments to the software output are necessary to provide accurate data. These adjustments are performed by the data reviewer, GC/MS operator, or GC chemist. An Extracted Ion Current Profile (EICP) or a GC chromatographic peak has been provided for the manual integration of each compound to demonstrate the accuracy of that process. Adjustments are flagged on the quantitation report in the far right column beyond the FINAL concentration for GC/MS analysis, and in the "Flags" column for GC analysis. The manual editing/integration flags are:

M - Denotes that a manual integration has been performed for this compound. The manual integration was performed in order to provide the most accurate area count as possible for the peak.

H - Denotes that the data reviewer, GC/MS operator, or GC Chemist has chosen an alternate peak within the retention time window from that chosen by the software for that compound. No manual integration is performed in choosing an alternate peak. The software still performs the integration.

MH - Denotes that an alternate peak has been chosen within the retention time window from that chosen by the software for that compound and also a manual integration of the chosen peak has been performed. The manual integration was performed in order to provide the most accurate area count possible for the peak.

L - Denotes that the data reviewer or GC/MS operator has selected an alternate library search. This is typically done when an additional tentatively identified compound (TIC) has been added to the number of peaks searched. No manual integration is performed in choosing an alternate peak. The software still performs the integration.

ML - Denotes that an alternate library search has been selected and a manual integration has also been performed. This is typically done when an additional TIC has been added and the TIC peak also required a manual integration.

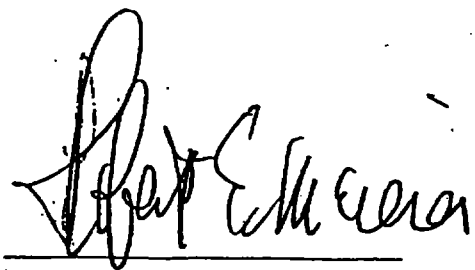
The EPA CLP SOW requires additional explanations for manual editing/integration. In the accompanying raw data packages, additional codes have been applied to the "M" flag and carry the following meanings;

M1 - The compound was not found by the automatic integration routine.

M2 - The compound was incorrectly integrated by the automatic integration routine.

M3 - The co-eluting compounds were incorrectly integrated by the automatic integration routine.

These codes will appear in the GC/MS and GC data packages.



Robert E. Meierer
Vice President

DATA REPORTING QUALIFIERS

On the Form I, under the column labeled "Q" for qualifier, each result is flagged with the specific data reporting qualifiers listed below, as appropriate. Up to five qualifiers may be reported on Form I for each compound. The qualifiers used are:

U: This flag indicates the compound was analyzed for but not detected. The Contract Required Quantitation Limit (CRQL), or reporting limit, will be adjusted to reflect any dilution and, for soils, the percent moisture.

J: This flag indicates an estimated value. The flag is used as detailed below:

1. When estimating a concentration for tentatively identified compounds (TICs) where a response factor of 1.0 is assumed for the TIC analyte,

2. When the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL (or Reporting Limit) but greater than zero, and

3. When the retention time data indicate the presence of a compound that meets the pesticide/Aroclor or other GC or HPLC identification criteria, and the result is less than the CRQL (or Reporting Limit) but greater than zero. For example, if the CRQL (or Reporting Limit) is 10 µg/L, but a concentration of 3 µg/L is calculated, it is reported as 3J.

N: This flag indicates presumptive evidence of a compound. This flag is only used for TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC such as 'chlorinated hydrocarbon', the N flag is not used.

P: In the EPA's Contract Laboratory Program (CLP), this flag is used for a pesticide/Aroclor target analyte, when there is greater than a 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form I and flagged with a P.
For SW-846 GC and HPLC analyses, when the Relative Percent Difference (RPD) is greater than 40% and there is no evidence of chromatographic anomalies or interferences, then the higher of the two values is reported and flagged with a P. When the RPD is equal to or less than 40%, our policy is to also report the higher of the two values, although the choice could be a project specific issue.

DATA REPORTING QUALIFIERS (continued)

C : This flag applies to GC or HPLC results where the identification has been confirmed by GC/MS. If GC/MS confirmation was attempted but was unsuccessful, this flag is not applied; a laboratory-defined flag is used instead (see the X/Y/Z qualifier.)

B : This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified target compound. The combination of flags BU or UB is not an allowable policy. Blank contaminants are flagged with a B only when they are detected in the sample.

E : This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than the upper level of the calibration range, the sample or extract will be diluted and reanalyzed. All such compounds with a response greater than the upper level of the calibration range will have the concentration flagged with an E on the Form I for the original analysis.

D : If a sample or extract is reanalyzed at a higher dilution factor, for example when the concentration of an analyte exceeds the upper calibration range, the DL suffix is appended to the sample number on the Form I for the more diluted sample, and all reported concentrations on that Form I are flagged with the D flag. This flag alerts data users that any discrepancies between the reported concentrations may be due to dilution of the sample or extract....

NOTE 1: The D flag is not applied to compounds that are not detected in the sample analysis i.e., compounds reported with the CRQL (or Reporting Limit) and the U flag.

NOTE 2: Separate Forms I are used for reporting the original analysis (Client Sample No. XXXXX) and the more diluted sample analysis (Client Sample No. XXXXXDL) i.e., the results from both analyses <u>are not combined</u> on a single Form 1.

A : This flag indicates that a TIC is a suspected aldol-condensation product.

X/Y/Z : Other specific flags may be required to properly define the results. If used, the flags will be fully described in the SDG Narrative. The laboratory-defined flags are limited to X, Y and Z.

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Method: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Method: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Contract: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	8.00	10	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	7.7	
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.86	1500	NJ
2.		UNKNOWN	8.06	5.8	J
3.	141-78-6	ETHYL ACETATE	8.28	7.2	NJ
4.	109-99-9	FURAN, TETRAHYDRO-	8.57	67	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	470	E
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	10	
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.86	1200	NJ
2.		UNKNOWN	8.06	6.4	J
3.		UNKNOWN	8.28	5.6	J
4.	109-99-9	FURAN, TETRAHYDRO-	8.57	65	NJ
5.	0-00-0	2-PHENYL-1,2-BIS(TRIMETHYLSI	16.68	8.7	NJ
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	17	U
74-87-3	Chloromethane	17	U
75-01-4	Vinyl Chloride	17	U
74-83-9	Bromomethane	17	U
75-00-3	Chloroethane	400	D
75-69-4	Trichlorofluoromethane	17	U
75-35-4	1,1-Dichloroethene	17	U
75-15-0	Carbon disulfide	17	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	17	U
67-64-1	Acetone	42	U
75-09-2	Methylene Chloride	13	DJB
156-60-5	trans-1,2-Dichloroethene	17	U
1634-04-4	Methyl-tert-butyl ether	17	U
75-34-3	1,1-Dichloroethane	17	U
156-59-2	cis-1,2-Dichloroethene	17	U
78-93-3	2-butanone	42	U
67-66-3	Chloroform	17	U
71-55-6	1,1,1-Trichloroethane	17	U
56-23-5	Carbon Tetrachloride	17	U
71-43-2	Benzene	17	U
107-06-2	1,2-Dichloroethane	17	U
79-01-6	Trichloroethene	17	U
78-87-5	1,2-Dichloropropane	17	U
75-27-4	Bromodichloromethane	17	U
10061-01-5	cis-1,3-Dichloropropene	17	U
108-10-1	4-Methyl-2-pentanone	42	U
108-88-3	Toluene	17	U
10061-02-6	trans-1,3-Dichloropropene	17	U
79-00-5	1,1,2-Trichloroethane	17	U
127-18-4	Tetrachloroethene	17	U
591-78-6	2-hexanone	42	U
124-48-1	Dibromochloromethane	17	U
106-93-4	1,2-Dibromoethane	17	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	17	U
100-41-4	Ethylbenzene	17	U
100-42-5	Styrene	17	U
75-25-2	Bromoform	17	U
98-82-8	Isopropyl Benzene	17	U
79-34-5	1,1,2,2-Tetrachloroethane	17	U
541-73-1	1,3-Dichlorobenzene	17	U
106-46-7	1,4-Dichlorobenzene	17	U
95-50-1	1,2-Dichlorobenzene	17	U
96-12-8	1,2-Dibromo-3-Chloropropane	17	U
120-82-1	1,2,4-Trichlorobenzene	17	U
1330-20-7	Xylene (total)	17	U
79-20-9	Methyl acetate	17	U
110-82-7	Cyclohexane	17	U
108-87-2	Methylcyclohexane	17	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.84	2100	NJD
2.	109-99-9	FURAN, TETRAHYDRO-	8.55	70	NJD
3.		LABORATORY ARTIFACT	13.24	23	JD
4.		LABORATORY ARTIFACT	14.88	18	JD
5.		LABORATORY ARTIFACT	16.66	17	JD
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(ul

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	14	
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	53	
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	1100	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.54	68	NJ
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	13	
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	52	
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	1100	NJ
2.	141-78-6	ETHYL ACETATE	8.24	7.6	NJ
3.	109-99-9	FURAN, TETRAHYDRO-	8.54	65	NJ
4.		LABORATORY ARTIFACT	16.65	8.7	J
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	110	
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	1.4	J
156-60-5	trans-1,2-Dichloroethene	1.9	J
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	3100	E
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	1.2	J
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(u

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	510	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.54	24	NJ
3.	39638-32-9	BIS(2-CHLOROISOPROPYL) ETHER	14.91	30	NJ
4.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	15.01	14	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	500	U
74-87-3	Chloromethane	500	U
75-01-4	Vinyl Chloride	500	U
74-83-9	Bromomethane	500	U
75-00-3	Chloroethane	500	U
75-69-4	Trichlorofluoromethane	500	U
75-35-4	1,1-Dichloroethene	500	U
75-15-0	Carbon disulfide	500	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	500	U
67-64-1	Acetone	570	DJ
75-09-2	Methylene Chloride	500	U
156-60-5	trans-1,2-Dichloroethene	500	U
1634-04-4	Methyl-tert-butyl ether	500	U
75-34-3	1,1-Dichloroethane	500	U
156-59-2	cis-1,2-Dichloroethene	500	U
78-93-3	2-butanone	1300	U
67-66-3	Chloroform	500	U
71-55-6	1,1,1-Trichloroethane	500	U
56-23-5	Carbon Tetrachloride	500	U
71-43-2	Benzene	15000	D
107-06-2	1,2-Dichloroethane	500	U
79-01-6	Trichloroethene	500	U
78-87-5	1,2-Dichloropropane	500	U
75-27-4	Bromodichloromethane	500	U
10061-01-5	cis-1,3-Dichloropropene	500	U
108-10-1	4-Methyl-2-pentanone	1300	U
108-88-3	Toluene	500	U
10061-02-6	trans-1,3-Dichloropropene	500	U
79-00-5	1,1,2-Trichloroethane	500	U
127-18-4	Tetrachloroethene	500	U
591-78-6	2-hexanone	1300	U
124-48-1	Dibromochloromethane	500	U
106-93-4	1,2-Dibromoethane	500	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	500	U
100-41-4	Ethylbenzene	500	U
100-42-5	Styrene	500	U
75-25-2	Bromoform	500	U
98-82-8	Isopropyl Benzene	500	U
79-34-5	1,1,2,2-Tetrachloroethane	500	U
541-73-1	1,3-Dichlorobenzene	500	U
106-46-7	1,4-Dichlorobenzene	500	U
95-50-1	1,2-Dichlorobenzene	500	U
96-12-8	1,2-Dibromo-3-Chloropropane	500	U
120-82-1	1,2,4-Trichlorobenzene	500	U
1330-20-7	Xylene (total)	500	U
79-20-9	Methyl acetate	500	U
110-82-7	Cyclohexane	500	U
108-87-2	Methylcyclohexane	500	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.82	1200	NJD
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	240	E
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	1.9	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	910	E
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	460	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.52	18	NJ
3.		BRANCHED ALKANE	14.87	29	J
4.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	14.98	9.8	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	36	U
74-87-3	Chloromethane	36	U
75-01-4	Vinyl Chloride	36	U
74-83-9	Bromomethane	36	U
75-00-3	Chloroethane	230	D
75-69-4	Trichlorofluoromethane	36	U
75-35-4	1,1-Dichloroethene	36	U
75-15-0	Carbon disulfide	36	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	36	U
67-64-1	Acetone	89	U
75-09-2	Methylene Chloride	36	U
156-60-5	trans-1,2-Dichloroethene	36	U
1634-04-4	Methyl-tert-butyl ether	36	U
75-34-3	1,1-Dichloroethane	36	U
156-59-2	cis-1,2-Dichloroethene	36	U
78-93-3	2-butanone	89	U
67-66-3	Chloroform	36	U
71-55-6	1,1,1-Trichloroethane	36	U
56-23-5	Carbon Tetrachloride	36	U
71-43-2	Benzene	1400	D
107-06-2	1,2-Dichloroethane	36	U
79-01-6	Trichloroethene	36	U
78-87-5	1,2-Dichloropropane	36	U
75-27-4	Bromodichloromethane	36	U
10061-01-5	cis-1,3-Dichloropropene	36	U
108-10-1	4-Methyl-2-pentanone	89	U
108-88-3	Toluene	36	U
10061-02-6	trans-1,3-Dichloropropene	36	U
79-00-5	1,1,2-Trichloroethane	36	U
127-18-4	Tetrachloroethene	36	U
591-78-6	2-hexanone	89	U
124-48-1	Dibromochloromethane	36	U
106-93-4	1,2-Dibromoethane	36	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	36	U
100-41-4	Ethylbenzene	36	U
100-42-5	Styrene	36	U
75-25-2	Bromoform	36	U
98-82-8	Isopropyl Benzene	36	U
79-34-5	1,1,2,2-Tetrachloroethane	36	U
541-73-1	1,3-Dichlorobenzene	36	U
106-46-7	1,4-Dichlorobenzene	36	U
95-50-1	1,2-Dichlorobenzene	36	U
96-12-8	1,2-Dibromo-3-Chloropropane	36	U
120-82-1	1,2,4-Trichlorobenzene	36	U
1330-20-7	Xylene (total)	36	U
79-20-9	Methyl acetate	36	U
110-82-7	Cyclohexane	36	U
108-87-2	Methylcyclohexane	36	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	730	NJD
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	2.3	J
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	27	
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	2.5	J
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	550	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.51	31	NJ
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	50	
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	13	
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	3800	E
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	6.3	
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	352-93-2	DIETHYL SULFIDE	9.62	9.5	NJ
2.		UNKNOWN	14.87	140	J
3.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	14.97	58	NJ
4.		LABORATORY ARTIFACT	16.62	5.3	J
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	2500	U
74-87-3	Chloromethane	2500	U
75-01-4	Vinyl Chloride	2500	U
74-83-9	Bromomethane	2500	U
75-00-3	Chloroethane	2500	U
75-69-4	Trichlorofluoromethane	2500	U
75-35-4	1,1-Dichloroethene	2500	U
75-15-0	Carbon disulfide	2500	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	2500	U
67-64-1	Acetone	6300	U
75-09-2	Methylene Chloride	2500	U
156-60-5	trans-1,2-Dichloroethene	2500	U
1634-04-4	Methyl-tert-butyl ether	2500	U
75-34-3	1,1-Dichloroethane	2500	U
156-59-2	cis-1,2-Dichloroethene	2500	U
78-93-3	2-butanone	6300	U
67-66-3	Chloroform	2500	U
71-55-6	1,1,1-Trichloroethane	2500	U
56-23-5	Carbon Tetrachloride	2500	U
71-43-2	Benzene	80000	D
107-06-2	1,2-Dichloroethane	2500	U
79-01-6	Trichloroethene	2500	U
78-87-5	1,2-Dichloropropane	2500	U
75-27-4	Bromodichloromethane	2500	U
10061-01-5	cis-1,3-Dichloropropene	2500	U
108-10-1	4-Methyl-2-pentanone	6300	U
108-88-3	Toluene	2500	U
10061-02-6	trans-1,3-Dichloropropene	2500	U
79-00-5	1,1,2-Trichloroethane	2500	U
127-18-4	Tetrachloroethene	2500	U
591-78-6	2-hexanone	6300	U
124-48-1	Dibromochloromethane	2500	U
106-93-4	1,2-Dibromoethane	2500	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	2500	U
100-41-4	Ethylbenzene	2500	U
100-42-5	Styrene	2500	U
75-25-2	Bromoform	2500	U
98-82-8	Isopropyl Benzene	2500	U
79-34-5	1,1,2,2-Tetrachloroethane	2500	U
541-73-1	1,3-Dichlorobenzene	2500	U
106-46-7	1,4-Dichlorobenzene	2500	U
95-50-1	1,2-Dichlorobenzene	2500	U
96-12-8	1,2-Dibromo-3-Chloropropane	2500	U
120-82-1	1,2,4-Trichlorobenzene	2500	U
1330-20-7	Xylene (total)	2500	U
79-20-9	Methyl acetate	2500	U
110-82-7	Cyclohexane	2500	U
108-87-2	Methylcyclohexane	2500	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

CompuChem
a Division of Liberty Analytical Corp.
501 Madison Avenue Cary, NC 27513

INORGANIC CASE SUMMARY NARRATIVE
SDG # 4937
PROTOCOL # SW-846

The indicated Sample Delivery Group (SDG) consisting of one (1) water sample was received into the laboratory management system (LIMS) on November 9, 2004 intact and in good condition with Chains of Custody (COC) records in order. Sample ID's reported in this data package are noted by the receiving department on the COC if they differ from those listed by the samplers on the COC.

The sample was analyzed for total manganese and iron using analytical methods delineated in SW-846 (Third Edition)-Update III.

SAMPLE IDs:

Customer IDs and correlating laboratory IDs are listed on the cover page.

INSTRUMENTAL QUALITY CONTROL:

All calibration verification solutions (ICV & CCV), blanks (ICB, CCB), and interference check samples (ICSA & ICSAB) associated with this data were confirmed to be within SW-846 allowable limits.

SAMPLE PREPARATION QUALITY CONTROL:

The sample preparation procedure verifications (LCSW & PBW) were found to be within acceptable ranges and all field samples were prepared and analyzed within the contract specified holding times.

MATRIX RELATED QUALITY CONTROL:

No matrix quality control samples were prepared and analyze in this case.

The laboratory manager or his designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Thomas R. Cole
Data Reviewer II
November 22, 2004

CompuChem
a Division of Liberty Analytical Corp.
501 Madison Avenue Cary, NC 27513

DATA REPORTING QUALIFIERS FOR INORGANICS

On Form I, under the column labeled "C" for concentration qualifier and "Q" for qualifier, each result is flagged with the specific data reporting qualifiers listed below, as appropriate. Up to five qualifiers may be reported on Form I for each analyte.

The C (concentration) qualifiers used are:

U: This flag indicates the analyte was analyzed for but not detected. This reported value was obtained from a reading that was less than the Instrument Detection Limit (IDL). The IDL will be adjusted to reflect any dilution and, for soils, the percent moisture.

B: This flag indicates the analyte was analyzed for and the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

The Q qualifiers used are:

E: This flag indicates an estimated value. This flag is used:

1. When the serial dilution (a five fold dilution for CLP and a five fold dilution for SW-846 method 6010B) results are not within 10%. The analyte concentration must be sufficiently high (minimally a factor of 50X above the IDL in the original sample).

N: This flag indicates the sample spike recovery is outside of control limits:

***:** This flag is used for duplicate analysis when the sample and the sample duplicate results are not within control limits.

The extensions: D, S, SD, L. A, added to the end of the client ID represent as follows:

D: matrix duplicate
S: matrix spike
SD: matrix spike duplicate
L: serial dilution
A: post digestion spike

Method Codes:

P: ICP PLASMA
CV: MERCURY COLD VAPOR AA
CA: MIDI-DISTILLATION SPECTROPHOTOMETRIC

SW-846 METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

ACSGWLA7-20-21.5

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix (soil/water): WATER Lab Sample ID: 493702

Level (low/med): LOW Date Received: 11/09/04

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	15200			P
7439-96-5	Manganese	169			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

CompuChem
A Division of Liberty Analytical Corp.
501 Madison Avenue Cary, NC 27513

INORGANIC CASE SUMMARY NARRATIVE
SDG # 4938
PROTOCOL #SW-846

The indicated Sample Delivery Group (SDG) consisting of one (1) water samples was received into the laboratory management system (LIMS) on November 9, 2004 intact and in good condition with Chain of Custody in order. Sample ID's reported in this data package are noted by the receiving department on the COC if they differ from those listed by the samplers on the COC.

The sample was analyzed for dissolved iron and manganese using analytical methods delineated in SW-846 (Update III).

SAMPLE IDs:

The cover page contained in this package lists the client ID's and the associated CompuChem numbers which are part of this SDG.

INSTRUMENTAL QUALITY CONTROL:

All calibration verification solutions (ICV, CCV), blanks (ICB, CCB) and interference check samples (ICSA & ICSAB) associated with this data were confirmed to be within SW-846 allowable limits.

SAMPLE PREPARATION QUALITY CONTROL:

The sample preparation procedure verifications (LCSW & PBW) were found to be within acceptable ranges. All field samples were prepared and analyzed within the contract specified holding times.

MATRIX RELATED QUALITY CONTROL:

The sample matrix quality control was not requested on this SDG. An LCS was performed.

Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.

Mary K. Powell
Data Reviewer II
November 20, 2004

Note: This report is paginated for reference and accountability.

SW846 METAL

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SCAGWLA7-20-21.5

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4938

Matrix (soil/water): WATER Lab Sample ID: 493801

Level (low/med): LOW Date Received: 11/9/04

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	9340			P
7439-96-5	Manganese	85.5			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

CompuChem
a division of Liberty Analytical Corp.

Wet Chemistry Notice

'O No. 4937 Case/SDG 4937

he C (concentration) qualifiers used in this report are:

= The reported value was obtained from a reading that was less than the reporting limit but greater than or equal to the MDL.

J The analytical result was less than the MDL.

: Q qualifiers used in this report are:

N= Spiked sample recovery is not within control limits.

' Duplicate analysis not within control limits.

N tice:

CompuChem's wet chemistry reporting policy is consistent with the current US EPA contract l: oratory program (CLP) inorganic statement of work (SOW) ILM05.2/ILM05.3 requirements.

The SOW requires a set number of decimal places for the Forms 3, 5, and 6. For this reason, r)re decimal places may be reported on these forms than were found in the raw data.

The SOW requires the RPD and %R values to be rounded to the nearest whole number on the J rms 5, 6, and 7.

Additional Comments:

I certify that this data package and these test results comply with the requirements of NELAC and CompuChem's QA Program unless otherwise indicated. The laboratory manager or designee has authorized the release of this data package and any associated electronic deliverables, as verified by the following signature.

Signature _____ Date 11-24-04

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
ACSGWLA7-20-21.5

Lab Name: COMPUCHEM Contract: NPL SITE

Lab Code: CompuChe Case No.: CHEM OX NRAS No.: _____ SDG No.: CHEM OX NP

Matrix: (soil/water) WATER Lab Sample ID: 493702

Level: (low/med) LOW Date Received: 11/09/2004

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): mg/L

CAS No.	Analyte	Concentration	C	Q	M
300.0-NO3	Nitrate	0.0500	U		
300.0-NO2	Nitrite	0.0500	U		
300.0-SO4	Sulfate	151			
415.1-TOC	TOC	17.5			

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

_____

_____

_____

_____

CompuChem

a division of Liberty Analytical Corporation
501 Madison Avenue
Cary, N.C. 27513
Tel: 919/379-4100 Fax: 919/379-4050

SDG NARRATIVE
SDG 4937
PROTOCOL: RSK-175

SAMPLE IDENTIFICATIONS:
ACSGWLA7-20-21.5

The one water sample listed above was received intact, properly refrigerated, with proper documentation, in sealed shipping containers, on November 9, 2004. The sample was scheduled for the requested analyses of the RSK-175 fraction. Protocol RSK-175 was used to prepare and analyze this sample, with the exceptions and/or additions requested by the client. This portion of the SDG narrative deals with the RSK-175 fraction only. All pertinent Quality Assurance notices are included in the narrative section and all pertinent Laboratory notices for SDG # 4937 are included in the sample data sections.

RSK-175

Analysis holding time requirements were met for this sample.

The project analytes methane and ethane were detected above the Quantitation Limit (QL) in this sample.

In the undiluted analysis of this sample, the on-column amount of methane and ethane exceeded the instrument's calibration limits. The sample was reanalyzed at a 100x dilution to bring the on-column amount into calibration range. We have reported both analyses of this sample.

Manual quantitations were performed on one or more of the process files associated with this SDG. The reasons have been coded with explanations provided in the notice included in the narrative section of the SDG.

All QC criteria were met for all initial and continuing calibration standards associated to this SDG.

The associated method blank met all quality control criteria. The method blank contained levels of methane, ethane, and ethene within acceptance limits.

There is no associated duplicate matrix spikes for this SDG.

The associated Laboratory Control Sample (LCS) prepared and analyzed along with these samples met all accuracy criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Elsie S. Byrd
Senior Scientist I
November 22, 2004

DATA REPORTING QUALIFIERS (continued)

C : This flag applies to GC or HPLC results where the identification has been confirmed by GC/MS. If GC/MS confirmation was attempted but was unsuccessful, this flag is not applied; a laboratory-defined flag is used instead (see the X/Y/Z qualifier.)

B : This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified target compound. The combination of flags BU or UB is not an allowable policy. Blank contaminants are flagged B only when they are detected in the sample.

E : This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than the upper level of the calibration range, the sample or extract will be diluted and reanalyzed. All such compounds with a response greater than the upper level of the calibration range will have the concentration flagged with an E on Form I for the original analysis.

D : If a sample or extract is reanalyzed at a higher dilution factor, for example when the concentration of an analyte exceeds the upper calibration range, the DL suffix is appended to the sample number on Form I for the more diluted sample, and all reported concentrations on that Form I are flagged with the D flag. This flag alerts data users that any discrepancies between the reported concentrations may be due to dilution of the sample or extract.

NOTE 1: The D flag is not applied to compounds which are not detected in the sample analysis i.e. compounds reported with the CRQL (or Reporting Limit) and the U flag.

NOTE 2: Separate Form Is are used for reporting the original analysis (Client Sample No. XXXXX) and the more diluted sample analysis (Client Sample No. XXXXXDL) i.e. the results from both analyses <u>are not combined</u> on a single Form I.

A : This flag indicates that a TIC is a suspected aldol-condensation product.

X/Y/Z : Other specific flags may be required to properly define the results. If used, the flags will be fully described in the SDG Narrative. The laboratory-defined flags are limited to X, Y and Z.

DATA REPORTING QUALIFIERS

On the Form I, under the column labeled "Q" for qualifier, each result is flagged with the specific data reporting qualifiers listed below, as appropriate. Up to five qualifiers may be reported on Form I for each compound. The qualifiers used are:

U : This flag indicates the compound was analyzed for but not detected. The Contract Required Quantitation Limit (CRQL), or reporting limit, will be adjusted to reflect any dilution and, for soils, the percent moisture.

J : This flag indicates an estimated value. The flag is used as detailed below:

1. When estimating a concentration for tentatively identified compounds (TICs) where a response factor of 1.0 is assumed for the TIC analyte,

2. When the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL (or Reporting Limit) but greater than zero, and

3. When the retention time data indicate the presence of a compound that meets the pesticide/Aroclor or other GC or HPLC identification criteria, and the result is less than the CRQL (or Reporting Limit) but greater than zero. For example, if the CRQL (or Reporting Limit) is 10 µg/L, but a concentration of 3 µg/L is calculated, it is reported as 3J.

N : This flag indicates presumptive evidence of a compound. This flag is only used for TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC such as 'chlorinated hydrocarbon', the N flag is not used.

P : In the EPA's Contract Laboratory Program (CLP), this flag is used for a pesticide/Aroclor target analyte, when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form I and flagged with a P.
For SW-846 GC and HPLC analyses, when the Relative Percent Difference (RPD) is greater than 40% and there is no evidence of chromatographic anomalies or interferences, then the higher of the two values is reported and flagged with a P. When the RPD is equal to or less than 40%, our policy is to also report the higher of the two values, although the choice could be a project specific issue. For certain HPLC analyses, if one of the HPLC columns displays co-elution of target analytes, all results are reported from a primary column displaying no co-elution. Results are still flagged with a P if the RPD between columns is greater than 40%.

1D

GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ACSGWLA7 -20-21.5

Lab Name: COMPUCHEM Contract: RSK-175

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493702

Sample wt/vol: 0.500 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 11/09/04

Extraction: (SepF/Cont/Sonc) OTHER Date Extracted:11/18/04

Concentrated Extract Volume:_____(uL) Date Analyzed: 11/18/04

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	Methane	1400	BE
74-84-0	Ethane	110	BE
74-85-1	Ethene	0.8	BJ

1D

GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Contract: RSK-175

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493702

Sample wt/vol: 0.500 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 11/09/04

Extraction: (SepF/Cont/Sonc) OTHER Date Extracted:11/18/04

Concentrated Extract Volume:_____(uL) Date Analyzed: 11/18/04

Injection Volume: _____(uL) Dilution Factor: 100.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	Methane	1000	DB
74-84-0	Ethane	23	DBJ
74-85-1	Ethene	150	U

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 3, 2004

LDC Report Date: December 9, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: CompuChem

Sample Delivery Group (SDG): 4814

Sample Identification

ACS-GW-LA-TB01

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/16/04	Bromomethane	39.47	All samples in SDG 4814	J (all detects) UJ (all non-detects)	A
	Acetone	35.75		J (all detects) UJ (all non-detects)	

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
VBLKPD	11/16/04	Laboratory artifact (16.63)	6.7 ug/L	ACS-GW-LA-TB01

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Sample ACS-GW-LA-TB01 was identified as a trip blank. No volatile contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
ACS-GW-LA-TB01	1,2-Dichloroethane-d4	124 (80-120)	All TCL compounds	J (all detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

ACS-89
Volatiles - Data Qualification Summary - SDG 4814

SDG	Sample	Compound	Flag	A or P	Reason
4814	ACS-GW-LA-TB01	Bromomethane Acetone	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
4814	ACS-GW-LA-TB01	All TCL compounds	J (all detects)	P	Surrogate recovery (%R)

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4814

No Sample Data Qualified in this SDG

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4814

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Method: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	UJ
75-00-3	Chloroethane	5.0	U	
75-69-4	Trichlorofluoromethane	5.0	U	
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	UJ
75-09-2	Methylene Chloride	5.0	U	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	
71-43-2	Benzene	5.0	U	
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Method: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGW-LA-TB01

Lab Name: COMPUCHEM Contract: 82608

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4814

Matrix: (soil/water) WATER Lab Sample ID: 481411

Sample wt/vol: 5 (g/ml) ML Lab File ID: 481411A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/16/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	8.00	10	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

LDC #: 12856A1
SDG #: 4814
Laboratory: CompuChem

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 12/8/04
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/3/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥ 0.990 spec RRF only
IV.	Continuing calibration	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	QC Sample
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	TB = 1

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	ACS-GW-LA-TB01	11	VBLKPD	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl choride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-Isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12856A/
SDG #: 4814

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: PR
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/16/04	GSQ41116A59	B	39.47		All + BIK	J/UJ/A
			F	35.75		↓	↓

LDC #: ...8... +/
SDG #: 4814

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: ____

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Was a method blank associated with every sample in this SDG?
(Y) N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
(Y) N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.
Blank analysis date: 11/16/04
Conc. units: ug/L
Associated Samples: #1 (ND)

Compound	Blank ID	Sample Identification								
~~laboratory artifact~~	VBLKPD									
~~Methylene chloride~~	6.7 (16.63)									
~~Acetone~~										
CRQL										
TICs:										
Hexamethyl-cyclotrisiloxane										
Octamethyl-cyclotetrasiloxane										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 12856A1
SDG #: 4814

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		1	DCE	124 (80-120)	Jdetect/P
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 3, 2004

LDC Report Date: December 8, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: CompuChem

Sample Delivery Group (SDG): 4879

Sample Identification

ACS-GW-LA5-18-22
ACS-GW-LA6-18-22
ACS-GW-LA6-18-22DL

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/4/04	Bromomethane Chloroethane 1,2-Dichloroethane Bromoform	25.38 36.82 27.97 29.73	ACS-GW-LA5-18-22 ACS-GW-LA6-18-22 VBLKKP	J (all detects) UJ (all non-detects)	A
11/5/04	Bromomethane Chloroethane Trichlorofluoromethane 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dichloroethane	29.68 31.85 34.76 25.21 26.86 28.39	ACS-GW-LA6-18-22DL VBLKLG	J (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
VBLKLG	11/5/04	Methylene chloride	1.0 ug/L	ACS-GW-LA6-18-22DL

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
ACS-GW-LA6-18-22DL (3.3x)	Methylene chloride	13 ug/L	17UB ug/L

Samples ACS-GW-LA TB02 (from SDG 4937) and ACS-GW-LA TB01 (from SDG 4814) were identified as trip blanks. No volatile contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All samples in SDG 4879	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ACS-GW-LA6-18-22	Chloroethane	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples ACS-GW-LA3-16-19 and ACS-GW-LA-DUP01 (from SDG 4922) were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
Chloroethane	13	14	7
Benzene	52	53	2

ACS-89
Volatiles - Data Qualification Summary - SDG 4879

SDG	Sample	Compound	Flag	A or P	Reason
4879	ACS-GW-LA5-18-22 ACS-GW-LA6-18-22	Bromomethane Chloroethane 1,2-Dichloroethane Bromoform	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
4879	ACS-GW-LA6-18-22DL	Bromomethane Chloroethane Trichlorofluoromethane 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dichloroethane	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
4879	ACS-GW-LA5-18-22 ACS-GW-LA6-18-22 ACS-GW-LA6-18-22DL	All TCL compounds	None	P	Matrix spike/Matrix spike duplicates
4879	ACS-GW-LA6-18-22	Chloroethane	J (all detects)	A	Compound quantitation and CRQLs

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4879

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P
4879	ACS-GW-LA6-18-22DL (3.3x)	Methylene chloride	17UB ug/L	A

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4879

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	UJ
75-00-3	Chloroethane	5.0	U	UJ
75-69-4	Trichlorofluoromethane	5.0	U	
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	5.0	U	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	
71-43-2	Benzene	7.7		
107-06-2	1,2-Dichloroethane	5.0	U	UJ
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/05

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
108-90-7	Chlorobenzene	5.0	U	
100-41-4	Ethylbenzene	5.0	U	
100-42-5	Styrene	5.0	U	
75-25-2	Bromoform	5.0	U	UJ
98-82-8	Isopropyl Benzene	5.0	U	
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U	
541-73-1	1,3-Dichlorobenzene	5.0	U	
106-46-7	1,4-Dichlorobenzene	5.0	U	
95-50-1	1,2-Dichlorobenzene	5.0	U	
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U	
120-82-1	1,2,4-Trichlorobenzene	5.0	U	
1330-20-7	Xylene (total)	5.0	U	
79-20-9	Methyl acetate	5.0	U	
110-82-7	Cyclohexane	5.0	U	
108-87-2	Methylcyclohexane	5.0	U	

12/9/05

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA5-18-22

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487901

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487901A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.86	1500	NJ
2.		UNKNOWN	8.06	5.8	J
3.	141-78-6	ETHYL ACETATE	8.28	7.2	NJ
4.	109-99-9	FURAN, TETRAHYDRO-	8.57	67	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	UJ
75-00-3	Chloroethane	470	E	J
75-69-4	Trichlorofluoromethane	5.0	U	
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	10		
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	
71-43-2	Benzene	5.0	U	
107-06-2	1,2-Dichloroethane	5.0	U	UJ
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
108-90-7	Chlorobenzene	5.0	U	
100-41-4	Ethylbenzene	5.0	U	
100-42-5	Styrene	5.0	U	
75-25-2	Bromoform	5.0	U	UJ
98-82-8	Isopropyl Benzene	5.0	U	
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U	
541-73-1	1,3-Dichlorobenzene	5.0	U	
106-46-7	1,4-Dichlorobenzene	5.0	U	
95-50-1	1,2-Dichlorobenzene	5.0	U	
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U	
120-82-1	1,2,4-Trichlorobenzene	5.0	U	
1330-20-7	Xylene (total)	5.0	U	
79-20-9	Methyl acetate	5.0	U	
110-82-7	Cyclohexane	5.0	U	
108-87-2	Methylcyclohexane	5.0	U	

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA6-18-22

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902A59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/04/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(ul

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.86	1200	NJ
2.		UNKNOWN	8.06	6.4	J
3.		UNKNOWN	8.28	5.6	J
4.	109-99-9	FURAN, TETRAHYDRO-	8.57	65	NJ
5.	0-00-0	2-PHENYL-1,2-BIS(TRIMETHYLSI	16.68	8.7	NJ
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	17	U
74-87-3	Chloromethane	17	U
75-01-4	Vinyl Chloride	17	U
74-83-9	Bromomethane	17	U UJ
75-00-3	Chloroethane	400	D J
75-69-4	Trichlorofluoromethane	17	U UJ
75-35-4	1,1-Dichloroethene	17	U
75-15-0	Carbon disulfide	17	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	17	U
67-64-1	Acetone	42	U
75-09-2	Methylene Chloride	13	DJB 17UB
156-60-5	trans-1,2-Dichloroethene	17	U
1634-04-4	Methyl-tert-butyl ether	17	U
75-34-3	1,1-Dichloroethane	17	U
156-59-2	cis-1,2-Dichloroethene	17	U
78-93-3	2-butanone	42	U
67-66-3	Chloroform	17	U
71-55-6	1,1,1-Trichloroethane	17	U UJ
56-23-5	Carbon Tetrachloride	17	U UJ
71-43-2	Benzene	17	U
107-06-2	1,2-Dichloroethane	17	U UJ
79-01-6	Trichloroethene	17	U
78-87-5	1,2-Dichloropropane	17	U
75-27-4	Bromodichloromethane	17	U
10061-01-5	cis-1,3-Dichloropropene	17	U
108-10-1	4-Methyl-2-pentanone	42	U
108-88-3	Toluene	17	U
10061-02-6	trans-1,3-Dichloropropene	17	U
79-00-5	1,1,2-Trichloroethane	17	U
127-18-4	Tetrachloroethene	17	U
591-78-6	2-hexanone	42	U
124-48-1	Dibromochloromethane	17	U
106-93-4	1,2-Dibromoethane	17	U

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	17	U
100-41-4	Ethylbenzene	17	U
100-42-5	Styrene	17	U
75-25-2	Bromoform	17	U
98-82-8	Isopropyl Benzene	17	U
79-34-5	1,1,2,2-Tetrachloroethane	17	U
541-73-1	1,3-Dichlorobenzene	17	U
106-46-7	1,4-Dichlorobenzene	17	U
95-50-1	1,2-Dichlorobenzene	17	U
96-12-8	1,2-Dibromo-3-Chloropropane	17	U
120-82-1	1,2,4-Trichlorobenzene	17	U
1330-20-7	Xylene (total)	17	U
79-20-9	Methyl acetate	17	U
110-82-7	Cyclohexane	17	U
108-87-2	Methylcyclohexane	17	U

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA6
-18-22DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4879

Matrix: (soil/water) WATER Lab Sample ID: 487902

Sample wt/vol: 5 (g/ml) ML Lab File ID: 487902DA59

Level: (low/med) LOW Date Received: 11/04/04

% Moisture: not dec. _____ Date Analyzed: 11/05/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 3.3

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.84	2100	NJD
2.	109-99-9	FURAN, TETRAHYDRO-	8.55	70	NJD
3.		LABORATORY ARTIFACT	13.24	23	JD
4.		LABORATORY ARTIFACT	14.88	18	JD
5.		LABORATORY ARTIFACT	16.66	17	JD
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

LDC #: 12856B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/8/04
SDG #: 4879 Level III Page: 1 of 1
Laboratory: CompuChem Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/3/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥ 0.990 SPCC RRF only ↓
IV.	Continuing calibration	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	None/P
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D= ACS-GW-LA5-16-19 / ACS-GW-LA-DUP01 / SDG # 4922
XVII.	Field blanks	ND	TB= ACS-GW-LA-TB01 SDG 4814

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

TB= ACW-GW-LA-TB02 SDG # 4937

Validated Samples: Water

1	ACS-GW-LA5-18-22	11	VBLKKP	21		31	
2	ACS-GW-LA6-18-22	12	VBLKLG	22		32	
3	ACS-GW-LA6-18-22DL	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl choride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12856B1
SDG #: 4879

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/4/04	GS041104A59	B	25.38		1, 2, VBLKKP	J/UJ/A
			D	36.82			
			L	27.97			
			X	29.73			
	11/5/04	GS041105A59	B	29.68		3, VBLKLG	J/UJ/A
			D	31.85			
			KK	34.76			
			N	25.21			
			O	26.86			
			L	28.39			

JCAL

LDC #: 1485 v1
SDG #: 4879

ALI[illegible]TION CONDITIONS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: RP
2nd Reviewer: 9A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 11/5/04
Conc. units: ug/L
Associated Samples: 3

Compound	Blank ID	3.3 x Dil	Sample Identification							
	VBLKLG									
Methylene chloride	1.0		13/17UB							
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
[illegible]										
Methylene chloride										
Acetone										
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 12856 B1
SDG #: 4879

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2	D exceeded cal range		J/A detect

Comments: See sample calculation verification worksheet for recalculations

LDC #: 12856B1
SDG #: 4879

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: FR
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
D	13	14	7
V	52	53	2

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 5, 2004

LDC Report Date: December 21, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: CompuChem

Sample Delivery Group (SDG): 4922

Sample Identification

ACS-GW-LA9-15-19
ACS-GW-LA9-15-19DL
ACS-GW-LA3-16-19
ACS-GW-LA-DUP01
ACS-GW-LA9-15-19DLMS
ACS-GW-LA9-15-19DLMSD

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/8/04	Chloroethane Carbon tetrachloride 4-Methyl-2-pentanone 2-Hexanone	26.60 28.06 25.95 29.18	All samples in SDG 4922	J (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples ACS-GW-LA TB02 (from SDG 4937) and ACS-GW-LA TB01 (from SDG 4814) were identified as trip blanks. No volatile contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
ACS-GW-LA9-15-19	Dibromofluoromethane 1,2-Dichloroethane-d4	122 (80-120) 125 (80-120)	All TCL compounds	J (all detects) J (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ACS-GW-LA9-15-19	Benzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples ACS-GW-LA3-16-19 and ACS-GW-LA-DUP01 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
Chloroethane	13	14	7
Benzene	52	53	2

ACS-89
Volatiles - Data Qualification Summary - SDG 4922

SDG	Sample	Compound	Flag	A or P	Reason
4922	ACS-GW-LA9-15-19 ACS-GW-LA9-15-19DL ACS-GW-LA3-16-19 ACS-GW-LA-*DUP01*	Chloroethane Carbon tetrachloride 4-Methyl-2-pentanone 2-Hexanone	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
4922	ACS-GW-LA9-15-19	All TCL compounds	J (all detects)	A	Surrogate recovery (%R)
4922	ACS-GW-LA9-15-19	Benzene	J (all detects)	A	Compound quantitation and CRQLs

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4922

No Sample Data Qualified in this SDG

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4922

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	
75-00-3	Chloroethane	110		J
75-69-4	Trichlorofluoromethane	5.0	U	
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	1.4	J	J
156-60-5	trans-1,2-Dichloroethene	1.9	J	J
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	UJ
71-43-2	Benzene	3100	E	J
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	UJ
108-88-3	Toluene	1.2	J	J
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	UJ
591-78-6	2-hexanone	13	U	
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA915-19

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	510	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.54	24	NJ
3.	39638-32-9	BIS(2-CHLOROISOPROPYL) ETHER	14.91	30	NJ
4.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	15.01	14	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	500	U	
74-87-3	Chloromethane	500	U	
75-01-4	Vinyl Chloride	500	U	
74-83-9	Bromomethane	500	U	
75-00-3	Chloroethane	500	U	UJ
75-69-4	Trichlorofluoromethane	500	U	
75-35-4	1,1-Dichloroethene	500	U	
75-15-0	Carbon disulfide	500	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	500	U	
67-64-1	Acetone	570	DJ	
75-09-2	Methylene Chloride	500	U	
156-60-5	trans-1,2-Dichloroethene	500	U	
1634-04-4	Methyl-tert-butyl ether	500	U	
75-34-3	1,1-Dichloroethane	500	U	
156-59-2	cis-1,2-Dichloroethene	500	U	
78-93-3	2-butanone	1300	U	
67-66-3	Chloroform	500	U	
71-55-6	1,1,1-Trichloroethane	500	U	
56-23-5	Carbon Tetrachloride	500	U	UJ
71-43-2	Benzene	15000	D	
107-06-2	1,2-Dichloroethane	500	U	
79-01-6	Trichloroethene	500	U	
78-87-5	1,2-Dichloropropane	500	U	
75-27-4	Bromodichloromethane	500	U	
10061-01-5	cis-1,3-Dichloropropene	500	U	
108-10-1	4-Methyl-2-pentanone	1300	U	UJ
108-88-3	Toluene	500	U	
10061-02-6	trans-1,3-Dichloropropene	500	U	
79-00-5	1,1,2-Trichloroethane	500	U	
127-18-4	Tetrachloroethene	500	U	
591-78-6	2-hexanone	1300	U	UJ
124-48-1	Dibromochloromethane	500	U	
106-93-4	1,2-Dibromoethane	500	U	

FORM I VOA

12/9/05

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	500	U
100-41-4	Ethylbenzene	500	U
100-42-5	Styrene	500	U
75-25-2	Bromoform	500	U
98-82-8	Isopropyl Benzene	500	U
79-34-5	1,1,2,2-Tetrachloroethane	500	U
541-73-1	1,3-Dichlorobenzene	500	U
106-46-7	1,4-Dichlorobenzene	500	U
95-50-1	1,2-Dichlorobenzene	500	U
96-12-8	1,2-Dibromo-3-Chloropropane	500	U
120-82-1	1,2,4-Trichlorobenzene	500	U
1330-20-7	Xylene (total)	500	U
79-20-9	Methyl acetate	500	U
110-82-7	Cyclohexane	500	U
108-87-2	Methylcyclohexane	500	U

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA915-19DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492201

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492201D2A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.82	1200	NJD
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	13	J
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U UJ
71-43-2	Benzene	52	
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U UJ
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U UJ
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA316-19

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492202

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492202RA59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	1100	NJ
2.	141-78-6	ETHYL ACETATE	8.24	7.6	NJ
3.	109-99-9	FURAN, TETRAHYDRO-	8.54	65	NJ
4.		LABORATORY ARTIFACT	16.65	8.7	J
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	
75-00-3	Chloroethane	14		J
75-69-4	Trichlorofluoromethane	5.0	U	
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	5.0	U	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	UJ
71-43-2	Benzene	53		
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	UJ
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	UJ
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA-DUP01

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4922

Matrix: (soil/water) WATER Lab Sample ID: 492203

Sample wt/vol: 5 (g/ml) ML Lab File ID: 492203A59

Level: (low/med) LOW Date Received: 11/06/04

% Moisture: not dec. _____ Date Analyzed: 11/08/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.83	1100	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.54	68	NJ
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/10/04

LDC #: 12856C1
SDG #: 4922
Laboratory: CompuChem

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 12/8/04
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/5/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 10.990 SPCC RRF only ↓
IV.	Continuing calibration	SW	
V.	Blanks	ND	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SWA	~~None~~ P
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 3 + 4
XVII.	Field blanks	ND	TB = ACW-GW-LA-TB02 SDG# 4937 TB= ACS-GW-LA-TB01 SDG# 4814

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

water

1	ACS-GW-LA9-~~16~~15-19	11	VBLKNA	21		31	
2	ACS-GW-LA9-~~16~~15-19DL	12		22		32	
3	ACS-GW-LA3-16-19 D ✓	13		23		33	
4	ACS-GW-LA-DUP01 D ✓	14		24		34	
5	ACS-GW-LA9-15-19DL MS	15		25		35	
6	ACS-GW-LA9-15-19DL MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl choride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12656A1
SDG #: 4922

ALI[illegible] ION [illegible]IDI[illegible] WO[illegible]SH[illegible]

Continuing Calibration

Page: 1 / 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/8/04	GS041108A59	D	26.60		All + Blk	J/UJ/A
			O	28.06		↓	↓
			Y	25.95			
			Z	29.18			

LDC #: 12856C1
SDG #: 4922

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: EJ
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		1	DFM	122 (80-120)	J/A detect
			DCE	125 (80-120)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

LDC #: 12856V1
SDG #: 4922

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1	V exceeded cal range		J/A detect

Comments: See sample calculation verification worksheet for recalculations

LDC #: 12856C1
SDG #: 4922

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	3	4	
D	13	14	7
V	52	53	2

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 8, 2004

LDC Report Date: December 8, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: CompuChem

Sample Delivery Group (SDG): 4936

Sample Identification

ACS-GW-LA8-17-20
ACS-GW-LA7-20-21.5
ACS-GW-LA7-20-21.5DL

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/9/04	Chloromethane Trichlorofluoromethane Carbon tetrachloride 2-Hexanone	27.38 31.51 32.48 28.18	All samples in SDG 4936	J (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples ACS-GW-LA TB02 (from SDG 4937) and ACS-GW-LA TB01 (from SDG 4814) were identified as trip blanks. No volatile contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All samples in SDG 4936	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ACS-GW-LA7-20-21.5	Chloroethane Benzene	Sample result exceeded *calibration range.*	Reported result should *be within calibration* range.	J (all detects) J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples ACS-GW-LA3-16-19 and ACS-GW-LA-DUP01 (from SDG 4922) were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
Chloroethane	13	14	7
Benzene	52	53	2

ACS-89
Volatiles - Data Qualification Summary - SDG 4936

SDG	Sample	Compound	Flag	A or P	Reason
4936	ACS-GW-LA8-17-20 ACS-GW-LA7-20-21.5 ACS-GW-LA7-20-21.5DL	Chloromethane Trichlorofluoromethane Carbon tetrachloride 2-Hexanone	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
4936	ACS-GW-LA8-17-20 ACS-GW-LA7-20-21.5 ACS-GW-LA7-20-21.5DL	All TCL compounds	None	P	Matrix spike/Matrix spike duplicates
4936	ACS-GW-LA7-20-21.5	Chloroethane Benzene	J (all detects) J (all detects)	A	Compound quantitation and CRQLs

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4936

No Sample Data Qualified in this SDG

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4936

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	UJ
75-01-4	Vinyl Chloride	2.3	J	
74-83-9	Bromomethane	5.0	U	
75-00-3	Chloroethane	27		
75-69-4	Trichlorofluoromethane	5.0	U	UJ
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	5.0	U	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	UJ
71-43-2	Benzene	2.5	J	
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	UJ
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY *IDENTIFIED COMPOUNDS*

CLIENT SAMPLE NO.

ACSGWLA8-17-20

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493601

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493601A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	550	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.51	31	NJ
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(ul

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	UJ
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	
75-00-3	Chloroethane	240	E	J
75-69-4	Trichlorofluoromethane	5.0	U	UJ
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	1.9	J	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	UJ
71-43-2	Benzene	910	E	J
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	UJ
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

11/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA7
-20-21.5

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	460	NJ
2.	109-99-9	FURAN, TETRAHYDRO-	8.52	18	NJ
3.		BRANCHED ALKANE	14.87	29	J
4.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	14.98	9.8	NJ
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	36	U	
74-87-3	Chloromethane	36	U	UJ
75-01-4	Vinyl Chloride	36	U	
74-83-9	Bromomethane	36	U	
75-00-3	Chloroethane	230	D	
75-69-4	Trichlorofluoromethane	36	U	UJ
75-35-4	1,1-Dichloroethene	36	U	
75-15-0	Carbon disulfide	36	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	36	U	
67-64-1	Acetone	89	U	
75-09-2	Methylene Chloride	36	U	
156-60-5	trans-1,2-Dichloroethene	36	U	
1634-04-4	Methyl-tert-butyl ether	36	U	
75-34-3	1,1-Dichloroethane	36	U	
156-59-2	cis-1,2-Dichloroethene	36	U	
78-93-3	2-butanone	89	U	
67-66-3	Chloroform	36	U	
71-55-6	1,1,1-Trichloroethane	36	U	
56-23-5	Carbon Tetrachloride	36	U	UJ
71-43-2	Benzene	1400	D	
107-06-2	1,2-Dichloroethane	36	U	
79-01-6	Trichloroethene	36	U	
78-87-5	1,2-Dichloropropane	36	U	
75-27-4	Bromodichloromethane	36	U	
10061-01-5	cis-1,3-Dichloropropene	36	U	
108-10-1	4-Methyl-2-pentanone	89	U	
108-88-3	Toluene	36	U	
10061-02-6	trans-1,3-Dichloropropene	36	U	
79-00-5	1,1,2-Trichloroethane	36	U	
127-18-4	Tetrachloroethene	36	U	
591-78-6	2-hexanone	89	U	UJ
124-48-1	Dibromochloromethane	36	U	
106-93-4	1,2-Dibromoethane	36	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(u

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	36	U
100-41-4	Ethylbenzene	36	U
100-42-5	Styrene	36	U
75-25-2	Bromoform	36	U
98-82-8	Isopropyl Benzene	36	U
79-34-5	1,1,2,2-Tetrachloroethane	36	U
541-73-1	1,3-Dichlorobenzene	36	U
106-46-7	1,4-Dichlorobenzene	36	U
95-50-1	1,2-Dichlorobenzene	36	U
96-12-8	1,2-Dibromo-3-Chloropropane	36	U
120-82-1	1,2,4-Trichlorobenzene	36	U
1330-20-7	Xylene (total)	36	U
79-20-9	Methyl acetate	36	U
110-82-7	Cyclohexane	36	U
108-87-2	Methylcyclohexane	36	U

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.
ACSGWLA7-20-21.5DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4936

Matrix: (soil/water) WATER Lab Sample ID: 493602

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493602DA59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/09/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 7.1

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	60-29-7	ETHER	5.80	730	NJD
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

LDC #: 12856D1

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12/8/07

SDG #: 4936

Page: 1 of 1

Laboratory: CompuChem

Reviewer: FR

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/8/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥0.990
IV.	Continuing calibration	SW	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	None /p
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = ACS-GW-LA3-16-19 / ACS-GW-LA-DUP01 > SDG # 4922
XVII.	Field blanks	ND	TB = ACW-GW-LA-TB02

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

SDG# 4937

TB = ACS-GW-LA-TB01 SDG# 4814

Validated Samples: water

1+	ACS-GW-LA8-17-20	11	VBLKJC	21		31	
2+	ACS-GW-LA7-20-21.5	12		22		32	
3†	ACS-GW-LA7-20-21.5DL	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl choride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC. 1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12856D1
SDG #: 4936

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FJ
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/9/04	GT041109A59	A	27.38		All + B|C	J/UJ/A
			KK	31.51			
			O	32.48			
			Z	28.18			

LDC #: 12856v1
SDG #: 4936

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2	D, V exceeded cal range		J/A det

Comments: See sample calculation verification worksheet for recalculations

LDC #: 28526D1
SDG #: 49362

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: FZ
2nd reviewer: 0

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
D	13	14	7
V	57	53	7

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 8, 2004

LDC Report Date: December 9, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: CompuChem

Sample Delivery Group (SDG): 4937

Sample Identification

ACS-GW-LA-TB02

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/17/04	Chloromethane	32.0	All samples in SDG 4937	J (all detects) UJ (all non-detects)	A
	Trichlorofluoromethane	26.81		J (all detects) UJ (all non-detects)	

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample ACS-GW-LA-TB02 was identified as a trip blank. No volatile contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

ACS-89
Volatiles - Data Qualification Summary - SDG 4937

SDG	Sample	Compound	Flag	A or P	Reason
4937	ACS-GW-LA-TB02	Chloromethane Trichlorofluoromethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4937

No Sample Data Qualified in this SDG

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4937

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
75-71-8	Dichlorodifluoromethane	5.0	U	
74-87-3	Chloromethane	5.0	U	UJ
75-01-4	Vinyl Chloride	5.0	U	
74-83-9	Bromomethane	5.0	U	
75-00-3	Chloroethane	5.0	U	
75-69-4	Trichlorofluoromethane	5.0	U	UJ
75-35-4	1,1-Dichloroethene	5.0	U	
75-15-0	Carbon disulfide	5.0	U	
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U	
67-64-1	Acetone	13	U	
75-09-2	Methylene Chloride	5.0	U	
156-60-5	trans-1,2-Dichloroethene	5.0	U	
1634-04-4	Methyl-tert-butyl ether	5.0	U	
75-34-3	1,1-Dichloroethane	5.0	U	
156-59-2	cis-1,2-Dichloroethene	5.0	U	
78-93-3	2-butanone	13	U	
67-66-3	Chloroform	5.0	U	
71-55-6	1,1,1-Trichloroethane	5.0	U	
56-23-5	Carbon Tetrachloride	5.0	U	
71-43-2	Benzene	5.0	U	
107-06-2	1,2-Dichloroethane	5.0	U	
79-01-6	Trichloroethene	5.0	U	
78-87-5	1,2-Dichloropropane	5.0	U	
75-27-4	Bromodichloromethane	5.0	U	
10061-01-5	cis-1,3-Dichloropropene	5.0	U	
108-10-1	4-Methyl-2-pentanone	13	U	
108-88-3	Toluene	5.0	U	
10061-02-6	trans-1,3-Dichloropropene	5.0	U	
79-00-5	1,1,2-Trichloroethane	5.0	U	
127-18-4	Tetrachloroethene	5.0	U	
591-78-6	2-hexanone	13	U	
124-48-1	Dibromochloromethane	5.0	U	
106-93-4	1,2-Dibromoethane	5.0	U	

FORM I VOA

12/9/04

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA-TB02

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4937

Matrix: (soil/water) WATER Lab Sample ID: 493701

Sample wt/vol: 5 (g/ml) ML Lab File ID: 493701A59

Level: (low/med) LOW Date Received: 11/09/04

% Moisture: not dec. _____ Date Analyzed: 11/17/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

LDC #: 12856E1
SDG #: 4937
Laboratory: CompuChem

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 12/8/04
Page: 1 of 1
Reviewer: FG
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/8/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥0.990 SPCC RRF only
IV.	Continuing calibration	SW	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	SC sample
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	TB=1

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	ACW-GW-LA-TB02	11	VBLKPF	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl chloride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC. 1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12856E1
SDG #: 4937

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/17/04	GT041117A59	A	32.0		All + Blk	J/UJ/A
			KK	26.81		↓	↓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: ACS-89

Collection Date: November 9, 2004

LDC Report Date: December 9, 2004

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level IV

Laboratory: CompuChem

Sample Delivery Group (SDG): 4951

Sample Identification

ACW-GW-LA9-6-10
ACW-GW-LA9-6-10DL

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

The review follows the Remedial Design/Remedial Action PRP - Lead Project Quality Assurance Project Plan (November 2001, Rev. 0) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B Compound or analyte was positively detected in a sample and in an associated blank.

UB Compound or analyte is not detected at or above the indicated concentration due to blank contamination.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all system performance check compounds (SPCCs) were within method criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

All of the continuing calibration RRF values for all system performance check compounds (SPCCs) were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
VBLKPN	11/10/04	Chloromethane Heptadecane (19.26)	1.5 ug/L 6.6 ug/L	ACW-GW-LA9-6-10
VBLKPO	11/11/04	Chloromethane Heptadecane (19.27)	1.3 ug/L 6.0 ug/L	ACW-GW-LA9-6-10DL

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Samples ACS-GW-LA TB02 (from SDG 4937) and ACS-GW-LA TB01 (from SDG 4814) were identified as trip blanks. No volatile contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
ACW-GW-LA9-6-10	Dibromofluoromethane 1,2-Dichloroethane-d4	127 (80-120) 133 (80-120)	All TCL compounds	J (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All samples in SDG 4951	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ACW-GW-LA9-6-10	Benzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

All tentatively identified compounds were within validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples ACS-GW-LA3-16-19 and ACS-GW-LA-DUP01 (from SDG 4922) were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
Chloroethane	13	14	7
Benzene	52	53	2

ACS-89
Volatiles - Data Qualification Summary - SDG 4951

SDG	Sample	Compound	Flag	A or P	Reason
4951	ACW-GW-LA9-6-10	All TCL compounds	J (all detects)	A	Surrogate recovery (%R)
4951	ACW-GW-LA9-6-10 ACW-GW-LA9-6-10DL	All TCL compounds	None	P	Matrix spike/Matrix spike duplicates
4951	ACW-GW-LA9-6-10	Benzene	J (all detects)	A	Compound quantitation and CRQLs

ACS-89
Volatiles - Laboratory Blank Data Qualification Summary - SDG 4951

No Sample Data Qualified in this SDG

ACS-89
Volatiles - Field Blank Data Qualification Summary - SDG 4951

No Sample Data Qualified in this SDG

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl Chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	50	J
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-15-0	Carbon disulfide	5.0	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	5.0	U
67-64-1	Acetone	13	U
75-09-2	Methylene Chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	13	J
1634-04-4	Methyl-tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	3800	E J
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	6.3	J
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-hexanone	13	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropyl Benzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
1330-20-7	Xylene (total)	5.0	U
79-20-9	Methyl acetate	5.0	U
110-82-7	Cyclohexane	5.0	U
108-87-2	Methylcyclohexane	5.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA9-6-10

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/10/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

Number TICs found: 4 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	352-93-2	DIETHYL SULFIDE	9.62	9.5	NJ
2.		UNKNOWN	14.87	140	J
3.	873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	14.97	58	NJ
4.		LABORATORY ARTIFACT	16.62	5.3	J
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	2500	U
74-87-3	Chloromethane	2500	U
75-01-4	Vinyl Chloride	2500	U
74-83-9	Bromomethane	2500	U
75-00-3	Chloroethane	2500	U
75-69-4	Trichlorofluoromethane	2500	U
75-35-4	1,1-Dichloroethene	2500	U
75-15-0	Carbon disulfide	2500	U
76-13-1	1,1,2-trichloro-1,2,2-triflu	2500	U
67-64-1	Acetone	6300	U
75-09-2	Methylene Chloride	2500	U
156-60-5	trans-1,2-Dichloroethene	2500	U
1634-04-4	Methyl-tert-butyl ether	2500	U
75-34-3	1,1-Dichloroethane	2500	U
156-59-2	cis-1,2-Dichloroethene	2500	U
78-93-3	2-butanone	6300	U
67-66-3	Chloroform	2500	U
71-55-6	1,1,1-Trichloroethane	2500	U
56-23-5	Carbon Tetrachloride	2500	U
71-43-2	Benzene	80000	D
107-06-2	1,2-Dichloroethane	2500	U
79-01-6	Trichloroethene	2500	U
78-87-5	1,2-Dichloropropane	2500	U
75-27-4	Bromodichloromethane	2500	U
10061-01-5	cis-1,3-Dichloropropene	2500	U
108-10-1	4-Methyl-2-pentanone	6300	U
108-88-3	Toluene	2500	U
10061-02-6	trans-1,3-Dichloropropene	2500	U
79-00-5	1,1,2-Trichloroethane	2500	U
127-18-4	Tetrachloroethene	2500	U
591-78-6	2-hexanone	6300	U
124-48-1	Dibromochloromethane	2500	U
106-93-4	1,2-Dibromoethane	2500	U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Method: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-90-7	Chlorobenzene	2500	U
100-41-4	Ethylbenzene	2500	U
100-42-5	Styrene	2500	U
75-25-2	Bromoform	2500	U
98-82-8	Isopropyl Benzene	2500	U
79-34-5	1,1,2,2-Tetrachloroethane	2500	U
541-73-1	1,3-Dichlorobenzene	2500	U
106-46-7	1,4-Dichlorobenzene	2500	U
95-50-1	1,2-Dichlorobenzene	2500	U
96-12-8	1,2-Dibromo-3-Chloropropane	2500	U
120-82-1	1,2,4-Trichlorobenzene	2500	U
1330-20-7	Xylene (total)	2500	U
79-20-9	Methyl acetate	2500	U
110-82-7	Cyclohexane	2500	U
108-87-2	Methylcyclohexane	2500	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACSGWLA9-6-10DL

Lab Name: COMPUCHEM Contract: 8260B

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 4951

Matrix: (soil/water) WATER Lab Sample ID: 495101

Sample wt/vol: 5 (g/ml) ML Lab File ID: 495101D2A59

Level: (low/med) LOW Date Received: 11/10/04

% Moisture: not dec. _____ Date Analyzed: 11/11/04

GC Column: ZB624 ID: 0.32 (mm) Dilution Factor: 500.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(u

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

FORM I VOA-TIC

12/9/04

LDC #: 12856F1
SDG #: 4951
Laboratory: CompuChem

VALIDATION COMPLETENESS WORKSHEET
Level IV

Date: 12/8/04
Page: 1 of
Reviewer:
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/9/04
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥0.990 SPCC RRF only
IV.	Continuing calibration	A	
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	None/P
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = ACS-GW-LA3-16-19 / ACS-GW-LA-DUP01 SDG# 4922
XVII.	Field blanks	ND	TB = ACW-GW-LA-TB02 SDG# 4937 TB = ACS-GW-LA-TB01 SDG# 4814

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	ACW-GW-LA9-6-10	11	VBLKPN	21		31	
2	ACW-GW-LA9-6-10DL	12	VBLKPO	22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 12856F1
SDG #: 4957

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) $\leq$ 25% and relative response factors (RRF) $\geq$ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	✓			
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	✓			
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?	✓			
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
XVII. Field blanks				
Field blanks were identified in this SDG.		X		
Target compounds were detected in the field blanks.				

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene
C. Vinyl choride**	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol
D. Chloroethane	V. Benzene	NN. Methyl ethyl ketone	FFF. 1,3-Dichlorobenzene	XXX. Di-Isopropyl ether
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol
F. Acetone	X. Bromoform*	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether
H. 1,1-Dichloroethene**	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether
I. 1,1-Dichloroethane*	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane*	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol
K. Chloroform**	CC. Toluene**	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile
L. 1,2-Dichloroethane	DD. Chlorobenzene*	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein
M. 2-Butanone	EE. Ethylbenzene**	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile
Q. 1,2-Dichloropropane**	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 11/10/04
Conc. units: ug/L
Associated Samples: 1 (ND)

Compound	Blank ID	Sample Identification								
	VBLKPN									
~~Methylene chloride~~										
~~Acetone~~ A	1.5									
TIC Heptadecane	6.6									
	(19.26)									
CRQL										

Blank analysis date: 11/11/04
Conc. units: ug/L
Associated Samples: 2 (ND)

Compound	Blank ID	Sample Identification								
	VBLKP0									
~~Methylene chloride~~										
~~Acetone~~ A	1.3									
TIC Heptadecane	6.0									
	(19.27)									
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 28 F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

(Y) N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		1	DFM	127 (80-120)	J det/A
			DCE	133 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

SUR.1SB

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: FD
2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1	✓ exceeded cal range		J/A detect

Comments: See sample calculation verification worksheet for recalculations

LDC #: 12856
SDG #:

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: FR
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	ACS-GW-LA3-16-19	ACS-GW-LA-DUP01	
D	13	14	7
V	52	53	2

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_is)/(A_is)(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (250 std)	Recalculated RRF (250 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	8260VCAL	11/10/04	~~Methylene chloride~~ chloromethane (1st internal standard)	0.22423	0.22423	0.24759962	0.24759	12.325	12.3
			~~Trichloroethene~~ Ethyl Benzene (2nd internal standard)	0.46948	0.46948	0.49421858	0.49422	6.613	6.6
			~~Toluene~~ 1,2 Dichlorobenzene (3rd internal standard)	1.31433	1.31433	1.35053504	1.35054	1.909	1.91
2			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (3rd internal standard)						
3			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (3rd internal standard)						
4			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	GS041111	11/11/04	~~Methylene chloride~~ Chloromethane (1st internal standard)	0.247160	0.1957505	0.19575	20.94	20.94
	A59		~~Trichloroethene~~ Ethyl Benzene (2nd internal standard)	0.4947200	0.4959633	0.49596	0.35	0.35
			~~Toluene~~ 1,2 Dichlorobenzene (3rd internal standard)	1.350540	1.436293	1.4362	6.34	6.34
			1,1,~~2,2-Tetrachloroethane~~ (4th internal standard)					
2			Methylene chloride (1st internal standard)					
			Trichloroethene (2nd internal standard)					
			Toluene (3rd internal standard)					
			1,1,2,2-Tetrachloroethane (4th internal standard)					
3			Methylene chloride (1st internal standard)					
			Trichloroethene (2nd internal standard)					
			Toluene (3rd internal standard)					
			1,1,2,2-Tetrachloroethane (4th internal standard)					
4			Methylene chloride (1st internal standard)					
			Trichloroethene (2nd internal standard)					
			Toluene (3rd internal standard)					
			1,1,2,2-Tetrachloroethane (4th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	250.0	217.073	87	87	0
Bromofluorobenzene	↓	237.086	95	95	↓
1,2-Dichloroethane-d4	↓	332.424	133	133	↓
Dibromofluoromethane	↓	316.913	127	127	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

LDC #: 08551 1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: B
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: VPNLCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	50	NA	42.62	NA	85	85				
Trichloroethene			45.45		91	91				
Benzene			46.56		93	93				
Toluene			48.40		97	97				
Chlorobenzene			48.52		97	97	NA			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 12856F1
SDG #: 4951

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer:
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #1, Chloroethane

Conc. = $\frac{(32639)(250)(\text{ng})}{(460249)(0.0764524)\ 5\text{ml}}$

=

50 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

LDC #12856
December 22, 2004

MWH Americas, Inc.
175 West Jackson Blvd, Suite 1900
Chicago, IL 60604-2814
ATTN: Mr. Chad Smith

SUBJECT: ACS-89, Data Validation

Dear Mr. Smith,

SUBJECT: Precision, Accuracy, Representativeness, Comparability, Completeness (PARCC) Summary Report for the ACS-89 Project

Enclosed is the Precision, Accuracy, Representativeness, Comparability, Completeness (PARCC) Summary Report for the ACS-89 project.

We appreciate this opportunity to support MWH Americas, Ic. in the performance of this project. Please feel free to call me at (760) 634-0437 if you have any questions.

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS SUMMARY REPORT

American Chemical Service

12/22/04

Table of Contents

Glossary

CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DQO	Data Quality Objectives
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
MS/MSD	Matrix Spike / Matrix Spike Duplicate
PARCC	Precision,Accuracy,Representativeness,Comparability, Completeness
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance / Quality Control
RPD	Relative Percent Difference
RRF	Relative Response Factor
RL	Reporting Limit
SDG	Sample Delivery Group
ug/Kg	Micrograms per Kilogram
ug/L	Micrograms per Liter
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
%D	Percent Difference
%R	Percent Recovery
%RSD	Percent Relative Standard Deviation

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS SUMMARY REPORT
American Chemical Service

1.0 INTRODUCTION

Remedial design/ remedial action was conducted at the American Chemical Service, Inc. NPL Site in Griffith, Indiana. This part of the site investigation for Lower Aquifer included the collection and analyses of 14 groundwater samples including quality control (QC) samples and dilutions. The analyses were performed by the following methods:

Volatile Organic Compounds by EPA SW 846 Method 8260B

Analytical services were provided by Compuchem who performed analyses on the groundwater samples. The samples were grouped into sample delivery groups (SDGs) of up to 20 field samples received by the laboratory. The environmental samples are associated with QA/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. Table I in Appendix A is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, and matrix. All shaded samples in Table I in Appendix A were reviewed under EPA Level 4 guidelines.

Approximately ten percent of the analytical data were validated according to EPA Level 4 data validation procedures and ninety percent of the analytical data were validated according to EPA Level 3 data validation procedures. The analytical data were evaluated for quality assurance and quality control (QA/QC) based on the following documents: *The Remedial Design/ Remedial Action PRP-Lead Project at the American Chemical Service, Inc. NPL Site, Griffith, Indiana Quality Assurance Project Plan*, November 2001, *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, and the *EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste.*

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, and comparability (PARCC) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCC summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCC criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 4 presents a summary of the PARCC criteria by comparing quantitative parameters with acceptability criteria defined in the project DQO's. Qualitative PARCC criteria are also summarized in this section.

Precision and Accuracy of Environmental Data

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a measurement. Errors in sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC

requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include: trip blanks, equipment rinsate blanks, field duplicates, method blanks, laboratory control samples (LCSs), surrogate spikes, matrix spike/matrix spike duplicates (MS/MSDs), and laboratory duplicates.

Before conducting the PARCC evaluation, the analytical data were validated according to the *Remedial Design/ Remedial Action PRP-Lead Project at the American Chemical Service, Inc. NPL Site, Griffith, Indiana Quality Assurance Project Plan,* November 2001, and the Functional Guidelines for Organic Data Review (USEPA 1999) and EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste. Samples not meeting the project procedures manual and the Functional Guideline acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation.

J Estimated The associated numerical value is an estimated quantity. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside the QC limits, but the exceedance was not sufficient to cause rejection of the data.

R Rejected The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte.

UB Analyte was not detected at or above the indicated concentration due to blank contamination. The "UB" flag is used to qualify any result detected in an environmental sample at a concentration less than 10 times the value of the concentration in any associated blank for common laboratory contaminants and less than 5 times the concentration in any associated blank for all other contaminants

B Analyte was positively detected in a sample and in an associated blank. The "B" flag is used to to qualify any result detected in an environmental sample at a concentration greater than 10 times the value of the concentration in any associated blank for common laboratory contaminants and greater than 5 times the concentration in any associated blank for all other contaminants

UJ Estimated/Nondetected Analyses were performed for the compound or analyte, but it was not detected and the sample quantitation or detection limit is an estimated quantity due to poor accuracy or precision. This qualification is also used to flag possible false negative results in the case where low bias in the analytical system is indicated by low calibration response, surrogate, internal standard, or other spike recovery.

Once the data are reviewed and qualified according to the *Remedial Design/ Remedial Action PRP-Lead Project at the American Chemical Service, Inc. NPL Site, Griffith, Indiana Quality Assurance Project Plan,* November 2001 and the functional guidelines, the data set is then evaluated using PARCC criteria. PARCC criteria provide an evaluation of overall data usability. The following is a discussion of PARCC criteria as related to the project DQOs.

Precision is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from percent recovery data. Precision is expressed as the relative percent difference (RPD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \times 100$$

Where D1 and D2 are the reported concentrations for sample and duplicate analyses. Precision is primarily assessed by calculating an RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, a laboratory duplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD result as the evaluation criteria.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCS. Non-aqueous LCSs are prepared using solid media approved by the American Society for Testing and Materials (ASTM) for their homogeneity. The LCS measures laboratory efficiency in recovering target analytes from either a solid or aqueous matrix in the absence of matrix interferences.

Laboratory and field sampling precision are further evaluated by calculating RPDs for aqueous field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the numerical QC limit in either MS/MSD samples or LCS/LCSD indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results maybe reported in either the primary or duplicate samples at levels below the reporting limit or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicate pairs do not suggest a significant impact on the data quality.

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS, and samples containing surrogate spikes. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Surrogate spikes are either isotopically labeled compounds or compounds that are not typically detected in the samples. Surrogate spikes are added to every blank, environmental sample, MS/MSD, and standard, for volatile organic (VOC) and bis-2-chloroethyl ether analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:
A = measured concentration in the spiked sample
B = measured concentration of the spike compound in the unspiked sample
C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples, LCS, and surrogate compounds added to environmental samples is evaluated with the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blank samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, field blanks and trip blanks.

A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

Trip blanks are used to identify possible volatile organic contamination introduced into the sample during transport. A trip blank is a sample bottle filled in the laboratory with reagent-grade water and preserved to a pH less than 2 with hydrochloric acid. It is transported to the site, stored with the sample containers, and returned unopened to the laboratory for analysis.

Contaminants found in both the environmental sample and a blank sample are assumed to be laboratory artifacts if the concentration in the environmental sample is less than 10 times the blank value for common laboratory contaminants; methylene chloride, acetone and 2-butanone or 5 times the blank value for other laboratory contaminants.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedances can cause loss of sample constituents due to biodegradation, precipitation, volatization, and chemical degradation.

Comparability is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCC criteria,

because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

Completeness is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 95 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:
%C = percent completeness
T = total number of sample results
R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the FSP or QAPP, with the number determined above.

The following sections present a review of QC data for each analytical method.

2.0 VOLATILE ORGANIC COMPOUNDS

A total of 14 groundwater samples were analyzed for volatile organic compounds (VOC) by EPA SW 846 Method 8260B. All volatile data were assessed to be valid since none of the 672 total results were rejected based on QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

2.1 Precision and Accuracy

2.1.1 Instrument Calibration

Initial and continuing calibration results provide a means of evaluating accuracy within a particular SDG. Relative response factor (RRF), percent relative standard deviation (%RSD), and percent difference (%D) are the three major parameters used to measure the effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. %RSD and %D exceedances suggest routine instrumental anomalies, which typically impact all sample results for the affected compounds.

The relative response factors for these compounds were above the criteria for acceptance of 0.05 in the initial calibration and/or the continuing calibration standards

Forty six VOC results were qualified detected estimated (J) and non-detected estimated (UJ). The percent difference between the initial calibration mean relative response factors and the continuing calibration relative response factors for acetone, bromomethane, chloroethane, 1,2-dichloroethane, bromoform, trichlorofluoromethane, 1,1,1-trichloroethane, carbon tetrachloride,

4-methyl-2-pentanone and 2-hexanone were outside the acceptance criteria of 25 percent. The affected samples were identified in the data validation reports.

2.1.2 Surrogates

Nine VOC results were qualified as detected estimated (J) in two samples. The surrogate percent recoveries for 1,2-dichloroethane-d4 and dibromofluoromethane were outside the acceptance criteria. The details regarding the qualification of results are provided in the data validation reports.

2.1.3 MS/MSD Samples

No data were qualified based on MS/MSD nonconformances. For those SDGs with MS/MSD results, the recoveries were evaluated against the acceptance criteria.

2.1.4 LCS Samples

No data were qualified based on LCS nonconformances. For those SDGs with LCS results, the recoveries were evaluated against the acceptance criteria.

2.1.5 Internal Standards

No data were qualified based on internal standard nonconformances. The recoveries and retention times were evaluated against the acceptance criteria.

2.1.6 Field Duplicate Samples

The field duplicate samples were evaluated for acceptable precision with RPDs for the compounds. The associated data validation narratives provided details regarding criteria exceeded. Sample data were not qualified on the basis of field duplicate precision.

2.1.7 Compound Quantitation and Target Identification

Due to compound quantitation nonconformances (ie, sample result exceeded calibration range) chloroethane in sample ACS-GW-LA6-18-22, benzene in samples ACS-GW-LA9-15-19 and ACW-GW-LA9-6-10 and chloroethane and benzene in sample ACS-GW-LA7-20-21.5 were qualified as detected estimated (J). The details regarding the qualification of results are provided in the data validation reports.

All target identifications were found to be acceptable.

2.2 Representativeness

2.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

2.2.2 Blanks

Method blanks and trip blanks were collected and analyzed to evaluate representativeness. The concentration for an individual target compounds in any of the two types of QA/QC blanks were used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results for organic compounds based on the following criteria. The validation qualifier codes used in the blank summary tables are described below.

> Results Below the RL If a sample result for the blank contaminant was less than the RL and less than 10 times the blank value for common contaminants or 5 times the blank value for other contaminants, the sample result was amended as a non-detected at the RL for the target compound and qualified with UB
>
> Results Above the RL If a sample result for the blank contaminant was greater than the sample RL and less than 10 times the blank value for common contaminants or 5 times the blank value for other contaminants, the sample result for the blank contaminant was amended as a non-detect at the concentration reported in the sample results and qualified with UB.
>
> If a sample result for the blank contaminant was greater than 10 times the blank value for common contaminants or 5 times the blank value for other contaminants, the result was not amended and qualified with B.

2.2.2.1 Method Blanks

As a result of method blank contamination, methylene chloride was qualified as non-detected (UB) in one sample. The details regarding the qualification of results are provided in the data validation reports.

2.2.2.2 Trip Blanks

No QC issues were associated with the trip blanks for this analysis.

2.2.2.3 Field Blanks

No QC issues were associated with the field blanks for this analysis.

2.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the method detection limits attained were at or below the reporting limit. Target compounds detected below the reporting limits flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

2.4 Completeness

The completeness level attained for volatile organic field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

3.0 VARIANCES IN ANALYTICAL PERFORMANCE

The laboratory used standard analytical method for volatile analyses throughout the project. No systematic variances in analytical performance were noted according to the laboratory SOW.

4.0 SUMMARY OF PARCC CRITERIA

The validation reports present the PARCC results for all SDGs. Each PARCC criterion is discussed in detail in the following sections.

4.1 Precision and Accuracy

Precision and accuracy were evaluated using data quality indicators such as MS/MSD, LCS, and surrogates. The precision and accuracy of the data set were considered acceptable after integration of qualification of estimated results as specifically noted in the data validation reports.

4.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. The representativeness of the project data is considered acceptable after qualification for blank contamination.

4.3 Comparability

Sampling frequency requirements were met in obtaining duplicates and necessary field blanks. The laboratory used standard analytical methods for their analyses. The analytical results were reported in correct standard units. Holding times, sample preservation, and sample integrity were within QC criteria. The overall comparability is considered acceptable.

4.4 Completeness

Of the 672 total analytes reported, none of the sample results were rejected. The completeness for all SDGs is as follows:

Parameter/Method	Total Analytes	No. of Rejects	%Completeness
Volatiles	672	0	100
Total	**672**	**0**	**100**

The completeness percentage based on rejected data met the 95 percent DQO goal.

APPENDIX B

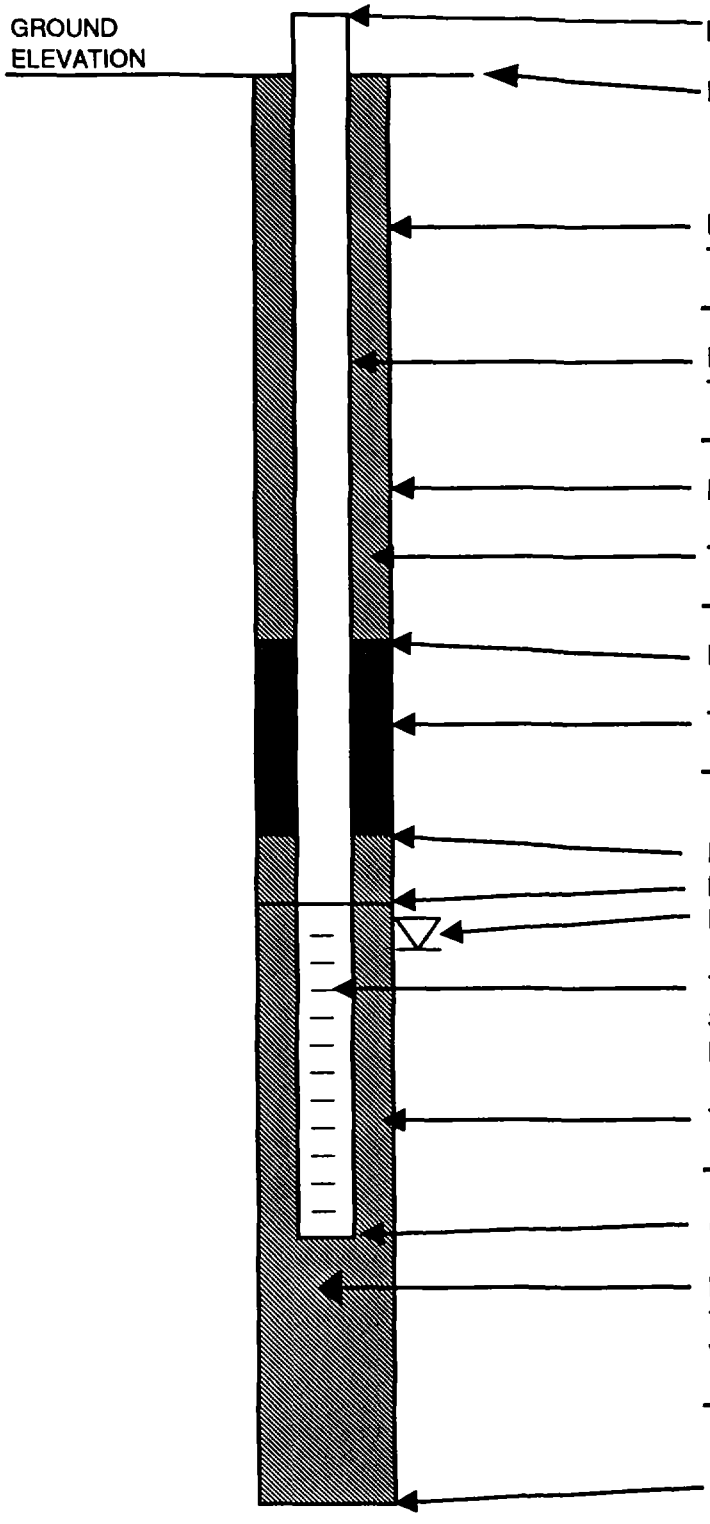
Piezometer Construction Forms

BORING NO. P93R
** Replaces P93, Outside Barrier Wall

MWH
MONTGOMERY WATSON HARZA

PIEZOMETER CONTRUCTION SHEET

PROJECT ACS	LOCATION Griffith, IN	DRILLER EFS
PROJECT NO. 2090601.012202	BORING P93R	DRILLING
ELEVATION	DATE 11/01/04	METHOD DPT - prepacked screen
FIELD GEOLOGIST Chad Smith		DEVELOPMENT METHOD None



ELEVATION OF TOP OF WELL CASING: 3.3' ags (639.05)

ELEVATION OF GROUND SURFACE: 0

I.D. OF SURFACE CASING: N/A
TYPE OF SURFACE CASING: None

RISER PIPE I.D.: 1 inch
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3.5 inch

TYPE OF BACKFILL: bentonite 3/8" chips

DEPTH OF SEAL: ~5' bgs

TYPE OF SEAL: bentonite 3/8" chips

DEPTH TOP OF SAND PACK: ~7' bgs
DEPTH TOP OF SCREEN: 11.7' bgs
FIRST ENCOUNTERED SATURATED ZONE 6.9' bgs

TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010" x 5' long
I.D. OF SCREEN 1"

TYPE OF SAND PACK: #5 sand pre-packed Geoprobe screen

DEPTH BOTTOM OF SCREEN: 16.7' bgs

DEPTH BOTTOM OF SAND PACK: 17' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: None

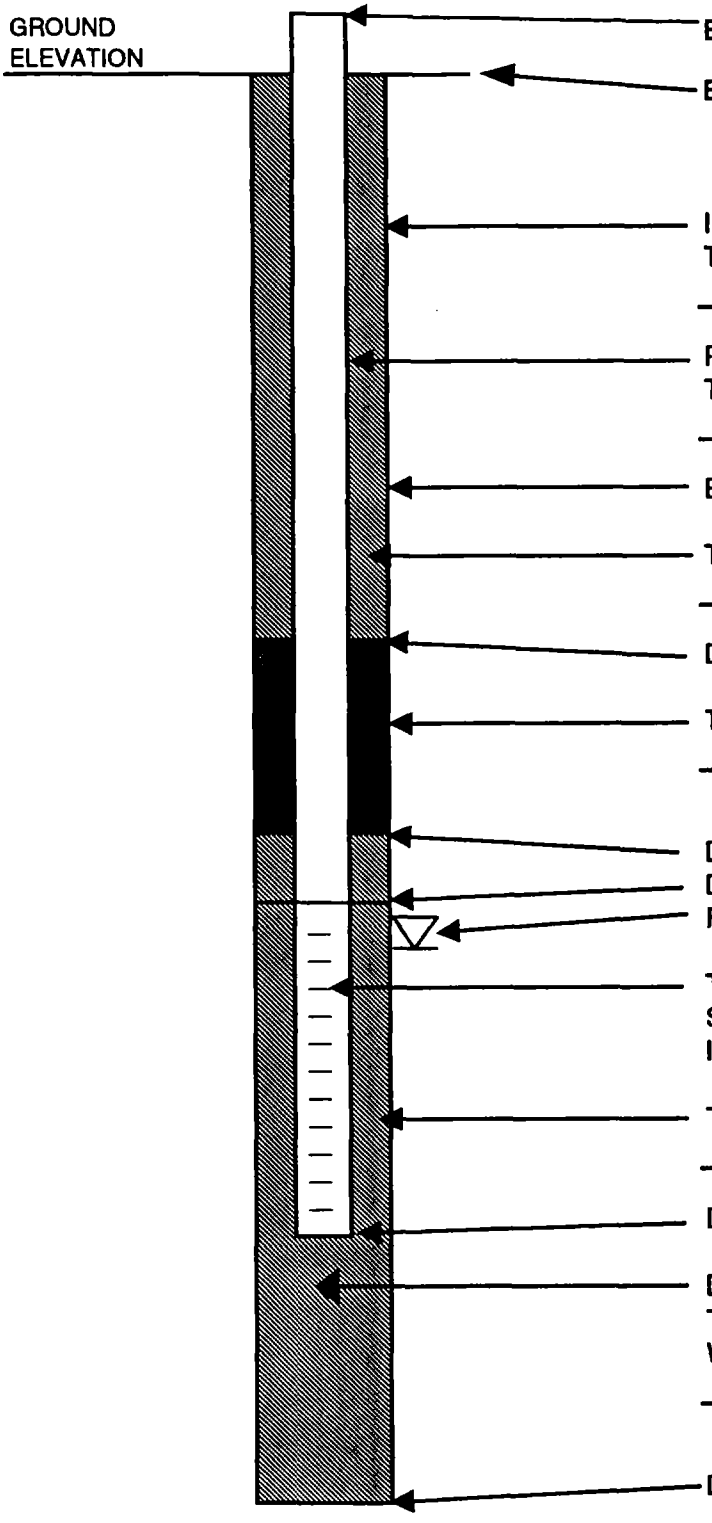
DEPTH OF HOLE: 17' bgs

BORING NO. P94R
** Replaces P94, Inside Barrier Wall

MWH
MONTGOMERY WATSON HARZA

PIEZOMETER CONTRUCTION SHEET

PROJECT	ACS	LOCATION	Griffith, IN	DRILLER	EFS
PROJECT NO.	2090601.012202	BORING	P94R	DRILLING METHOD	DPT - prepacked screen
ELEVATION		DATE	11/01/04	DEVELOPMENT METHOD	None
FIELD GEOLOGIST	Chad Smith				



ELEVATION OF TOP OF WELL CASING: 3.5' ags (640.99)

ELEVATION OF GROUND SURFACE: 0

I.D. OF SURFACE CASING: N/A
TYPE OF SURFACE CASING: None

RISER PIPE I.D.: 1 inch
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3.5 inch

TYPE OF BACKFILL: bentonite 3/8" chips

DEPTH OF SEAL: ~7' bgs

TYPE OF SEAL: bentonite 3/8" chips

DEPTH TOP OF SAND PACK: ~9' bgs
DEPTH TOP OF SCREEN: 11.5' bgs
FIRST ENCOUNTERED SATURATED ZONE 9.3' bgs

TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010" x 5' long
I.D. OF SCREEN 1"

TYPE OF SAND PACK: #5 sand pre-packed Geoprobe screen

DEPTH BOTTOM OF SCREEN: 16.5' bgs

DEPTH BOTTOM OF SAND PACK: 17.0' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: None

DEPTH OF HOLE: 17.0' bgs

APPENDIX C

Soil Boring Logs

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-3
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 631.4 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/04/04 End Date: 11/05/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				
1	S			100%	10	10'-12.1' SAND (SW); gray, medium to fine grained, no gravel, noticeable ether odor	44		
							90		
						12.1'-16.5' CLAY (CL); some silt, grayish brown, very stiff to hard, low plasticity, noticeable ether odor	80		Installed casing to 13.5
							25		
2	W			100%	15		0.0		
						16.5'-19.2' SAND (SW), medium to fine grained, trace silt, trace gravel at 16.5', noticeable ether odor	0.0		Sampled groundwater
							0.0		15'-19' for VOCs
						19.2'-20' SILT (ML), little to some clay, dense, medium cohesive, brown, moist, no ether odor	0.0		ACS-GW-LA3-16-19
3	S			100%	19		0.0		
					20	EOB at 20'			
					25				
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-4
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 633.4 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/04/04 End Date: 11/08/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				
1	S			100%	10	10'-14.4' SAND (SW); gray, medium to fine grained, little silt, no gravel, 2" silty clay seam at 13' coarser sand below clay seam, higher PID readings below clay.	12		
							14		Benzene draeger tube
							16		on headspace sample
							29		from 13'-14': >10 ppm
						14.4'-18' CLAY (CL); some silt, grayish brown, very stiff trace sand and gravel	24		
2	D			100%	15				Installed casing to 16'
							16		
							14.5		Groundwater not
3	W/S			100%	18	18'-20.8' SAND (SW), medium to fine grained, trace silt, trace gravel at 16.5', very strong ether odor	1.8		sampled due to ether
							5.4		degassing
					20	20.8'-21' clayey SILT (ML), dense, brown, moist	3.7		
						EOB at 21'			
						Note: After drilling through clay, bubbling could be heard from within the casing, and a strong ether odor was noticeable. Still bubbling after 1 day.			
					25				
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-5
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 632.0 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/01/04 End Date: 11/03/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
1	M/D			80%	0	0'-1' Topsoil, black	0		
						1'-12' SAND (SW); some silt, trace gravel, gray, fine to			
						medium grained.			
						4" gravelly seam at 2.5' and 3'	0		
						Faint ether odor at 5'			
2	S			100%	5	Coarse sand with some gravel from 5'-5.8'			
						Moderate ether odor from 5'-10'			
							6.5		
3	S			100%	10	12'-12.2' CLAY (CH), soft, high plasticity			
						12.2'-12.8' SAND (SW) Same as above	1.4		
						12.8'-13' CLAY (CH), soft, high plasticity			
						13'-13.9' SAND (SW), *same as above, strong ether odor*			
						13.9'-17' CLAY (CL); olive gray to brown, stiff, trace gravel,			
4	D			100%	15	low plasticity, slight ether odor within clay.			
							7.5		Installed casing to 16
5	S			100%	17	17'-22' SAND (SW), gray, medium grained, little to trace			
						gravel, moderate ether odor.	2		Sampled groundwater
							5.7		18'-22' for VOCs
6	S			100%	20	fine to medium grained with trace silt and gravel	1.7		ACS-GW-LA5-18-22
						from 20'-22', ether odor decreases with depth	0.9		
						EOB at 22' (no sample recovery from 22'-24' on two			
						attempts)			
					25				
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-6
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 632.2 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/02/04 End Date: 11/02/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				
1	S			100%	10	10'-13.6' SAND (SW); fine to medium grained, some silt,	13.7		penetrometer: 0.3
						trace gravel, medium gray, medium dense,			
						moderate ether odor			
						coarser sand from 11.8'-13.6'	7.2		penetrometer: 0.3
						13.6'-16.4' Clay (CL); grayish brown, some silt, trace sand			
2	S/W			100%	15	and gravel, very hard, low plasticity, slight	7.9		penetrometer: >4.5
						ether odor	7.5		Installed casing to 15.5
						16.4'-22' SAND (SW), medium gray, fine to medium	0.6		penetrometer: 1.7
						grained, some silt, trace coarse sand, moderate			Sampled groundwater
						ether odor			18'-22' for VOCs
3	S			100%	20				ACS-GW-LA6-18-22
							0.7		penetrometer: 1.4
						EOB at 22'			
					25	Note: After drilling through clay, bubbling could be heard			
						within casing, which stopped after a few hours.			
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-7
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 633.8 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/02/04 End Date: 11/08/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				
1	W			100%	10	10'-15' SAND (SW); fine grained, some silt, gray, medium dense, moderate ether odor	4.0		
						medium to coarse grained from 13'-15', trace gravel			
2	D			100%	15	15'-19.8' silty CLAY (CL); grayish brown, trace gravel, low plasticity, very hard, faint ether odor	31.5		Installed casing to 17
						trace large gravel from 18.5'-19.5'			Sampled groundwater
						ether odor	0		20'-21.5' for VOCs
3	S			100%	20	19.8'-21.7' SAND (SW), medium grained, noticeable ether odor.	0.6 3.5		ACS-GW-LA7-20-21.5 also analyzed for
						21.7'-22' silty CLAY (CL), stiff, wet, trace ether odor			several natural
						EOB at 22'			attenuation parameters
					25				
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-8
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 631.5 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/02/04 End Date: 11/08/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				
1	W			100%	10	10'-13' SAND (SW); gray, some silt, trace gravel, moderate ether odor	47.5		
							18.8		
						13'-17.4' CLAY (CL); some silt, grayish brown, trace gravel, low plasticity, very hard, faint ether odor	43.4		
							40		
2	D			100%	15		20.4		
3	D/W			100%	16		8.6		Installed casing to 15
						17.4'-20.2' SAND (SW), gray, medium to coarse grained, trace gravel, trace fine sand, dense, rounded to subrounded, noticeable ether odor	6.6		
							5.9		Sampled groundwater
							0.4		17'-20' for VOCs
4	M			100%	20	20.2'-21' SILT (ML), some clay, trace sand, no ether odor	0		ACS-GW-LA8-17-20
						EOB at 21'			
					25				
					30				

MWH
MONTGOMERY WATSON HARZA

SOIL BORING LOG

Project Name	Lower Aquifer Groundwater Investigation, Phase 1	**Boring No.**	LA-9
Location	American Chemical Service, Griffith, Indiana	**Project No.**	2090601

Drilling Company: EFS, Inc.
Driller's Name: Joshua Dutton
Driller's Helper:
Drill Method: Direct Push
Water Level: Hammer Torque:

Sketch of Boring Location
Approximate ground elevation: 631.1 ft amsl

Logger: C. Smith/B. Berg Editor: C. Smith
Start Date: 11/02/04 End Date: 11/05/04

Sample	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Depth	VISUAL CLASSIFICATION	PID (ppm)	Description	Remarks
					0	Blind drill to 10'			
					5				Sampled groundwater 6'-10' for VOCs ACS-GW-LA9-6-10
1	S			100%	10	10'-12' SAND (SW); gray, some silt, trace gravel and coarse sand, strong ether odor, 2" clay seams at 10.3' and 11'	42		
							73		
						12'-16.6' CLAY (CL); some silt, grayish brown, trace gravel, low plasticity, very hard, faint ether odor large gravel from 15.5'-16.6'	35.6		
							31.5		Installed casing to 14
2	W			100%	15		1.0		
						16.6'-19.1' SAND (SW), brown, coarse grained, some gravel, becomes medium grained at 17.2' with trace gravel. 2cm thick soft clayey silt seam at 17.8'	1.0		
							0.0		
3	S			100%	18		0.0		Sampled groundwater 15'-19' for VOCs ACS-GW-LA9-15-19
						20.2'-21' SILT (ML), little clay, dense, moist	0.0		
4	M			100%	20		0.0		
						EOB at 21'			
					25				
					30				